Pit and Quarry

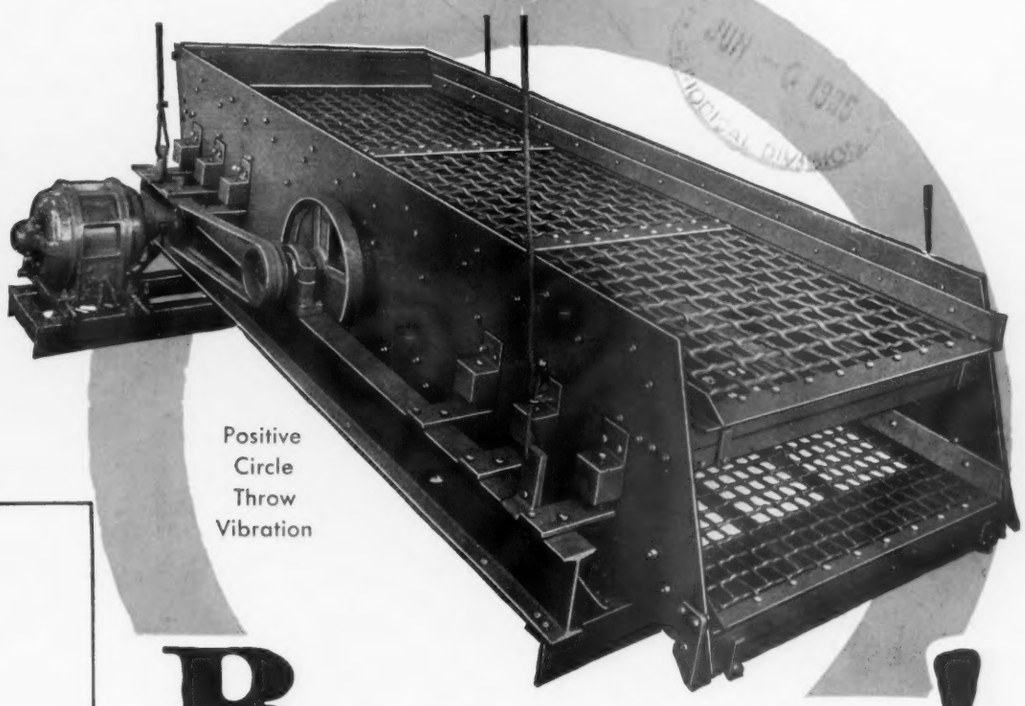
With which is consolidated

CEMENT-MILL & QUARRY

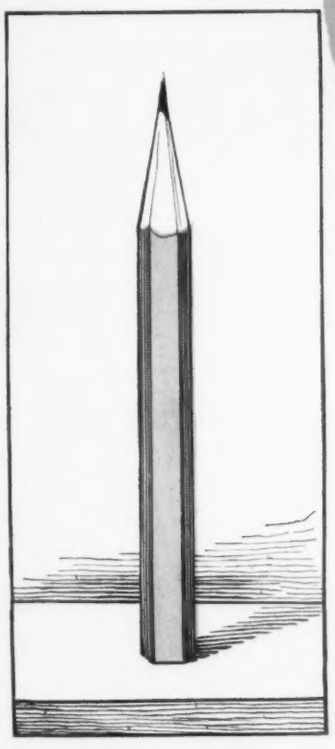
November, 1934

NRA U.S. CODE GRAPHIC ARTS INDUSTRY 1934

The **Tyler-Niagara Screen**



Positive Circle Throw Vibration



(To make this wonderful demonstration, showing the absence of destructive vibration, the screen is operated in a horizontal position.)

BALANCE!

The success of the Tyler-Niagara Screen is due to its positive circle-throw gyration maintained by true balance!

So accurately are these screens balanced that a pencil will stand upright on the supporting frame while the machine is operating. Send us the details of your problems for specific recommendations and prices!

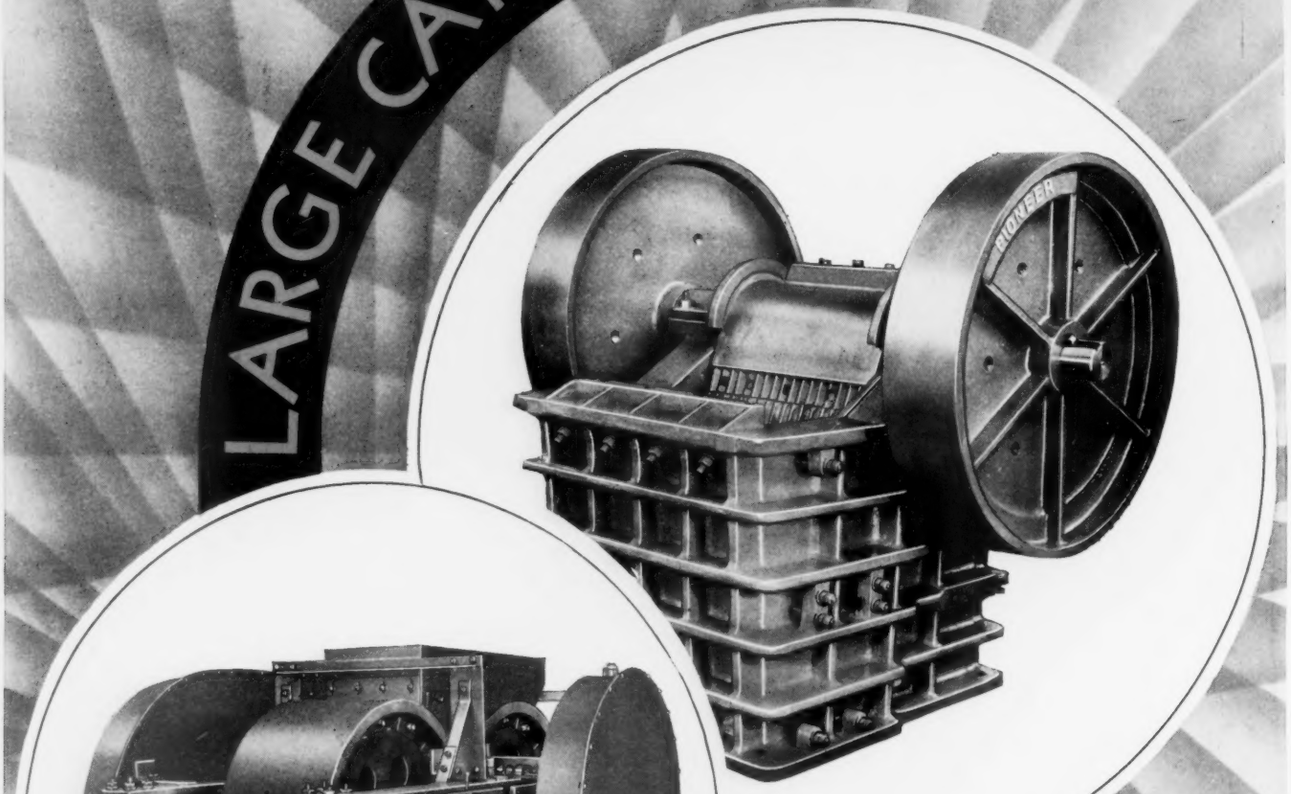
The W. S. Tyler Company

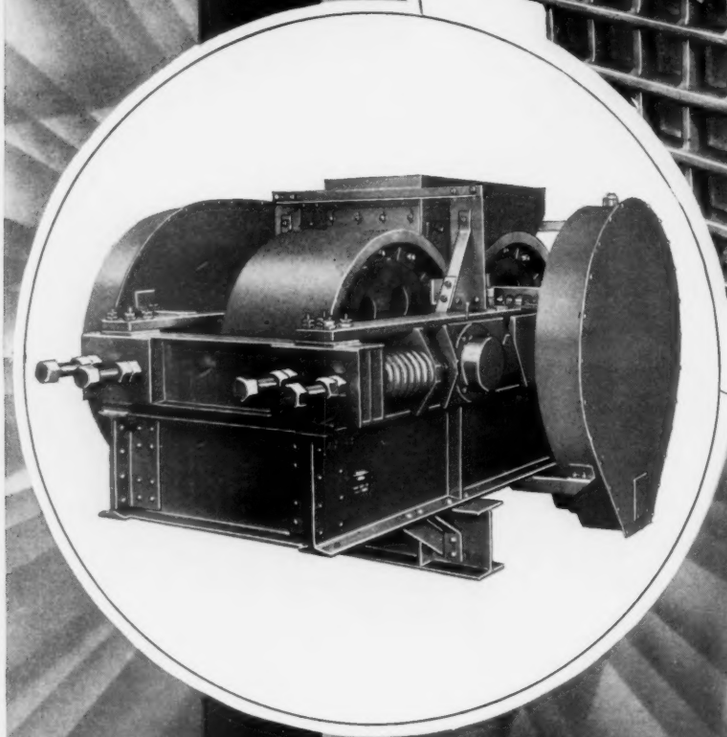
CLEVELAND, OHIO

★ Pages 17-21

PIONEER

LARGE CAPACITY CRUSHERS





THIS pair will crush 50 to 60 cubic yards per hour of 20″ cubes to pass 1″ minus with closed circuit—the primary is a Pioneer 24″x36″ All Steel Jaw Crusher—the secondary a Pioneer 40″x20″ Anti-friction Bearing Roll Crusher. The Roll Crusher is adjustable to produce material from 3″ to dust.

ASK FOR OUR NEW FOLDER "PIONEER CRUSHERS"
Pioneer Crushers Do Your Job Faster—Cheaper—Better

PIONEER GRAVEL EQUIPMENT MFG. CO.
1515 CENTRAL AVENUE • MINNEAPOLIS, MINNESOTA

GENERAL MOTORS T-18

A Low-Priced All-Purpose Truck

$675

CHASSIS F.O.B. PONTIAC

For only a few dollars more than the lowest-priced 1½-ton trucks, you can own this quality-built GMC T-18 of ample capacity for the job. During its lifetime, its small extra cost will be saved several times over, through lower operating and upkeep costs.

This GMC T-18 is a big, husky, capable 2-3 ton producer. It will haul loads and maintain schedules in a way you wouldn't expect from lighter and cheaper trucks. Yet it carries no needless weight to eat up gas, oil and tire dollars.

Like all other General Motors Trucks, the T-18 is "engineered for the job." Its wheelbase lengths are longer—140¾" and 164¾". Its weight distribution conforms to S.A.E. standards. It has many outstanding design features, including heavier frame; full-floating rear axle *with straddle-mounted pinion* for maximum strength and longer life; stronger, drop-forged wheels; modern, centrifuse brake drums that save on upkeep; and a valve-in-head GMC engine whose higher sustained torque insures faster deliveries, more trips, greater profit. And best of all, this worker and earner is $80 lower in price than the average of other trucks of comparable size.

A General Motors Truck representative will be glad to supply additional information. A phone call will bring him to your place of business.

GENERAL MOTORS TRUCKS AND TRAILERS

GENERAL MOTORS TRUCK COMPANY — Time Payments Available Through Our Own Y. M. A. C. — PONTIAC, MICHIGAN

MAY 25 1935 ©C1B 262592

Pit and Quarry

With which is consolidated
CEMENT-MILL & QUARRY

Volume 27 November, 1934 Number 5

MEMBER AUDIT BUREAU OF CIRCULATIONS

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other non-metallic minerals. Entered as second-class matter November 28, 1932, at the Postoffice at Chicago, Ill., under the Act of March 3, 1897.

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In This Issue

News of the Industry 17

Editorials 22

Labor Provisions of N. R. A. Codes Show Numerous Striking Differences 24

Success of Recent Blast Shows the Value of Analyzing Experience Data 29

Efficient Vertical-Kiln Control Used in Louisiana's New Lime Plant 30

Diesel Engines Drive Generators in New Missouri Crushed-Stone Plant 36

Men of the Industry . . . 39
Personal Mention 40
Coming Events 40
New Corporations 40
Aggregates Statistics . . . 41
Latest Cement Statistics . 42
Lime Shipments 43
Labor Conditions 44
Foreign Developments . . 46
New Machinery and Supplies 47

NRA U.S. CODE GRAPHIC ARTS INDUSTRY 1934

BETTER BELTS BRING DOWN YOUR COSTS

GOODYEAR Conveyor Belts carry more tons, at lower cost per ton. They do so because they are built better and scientifically specified to their particular duty by the G.T.M.—Goodyear Technical Man.

"Built better" means that they are constructed, *balanced body and cover*, of the right gauge materials, right number of plies and right cover stock to bear the loads, withstand abrasion and deliver longer trouble-free life. They don't give out in body or cover while there still is undelivered usefulness in the other part.

"G. T. M.-specified" means they are recommended by an expert on rubber after an on-the-ground study of the operating requirements they are called on to meet. They are accurately applied and carefully serviced.

Besides conveyor belts, Goodyear equipment for Sand and Gravel Plants includes such Goodyear-developed specialties as Goodyear Sand Suction Hose and Goodyear Dredging Sleeves; for Rock Products Industries, Cement and Stone Plants, Goodyear Elevator and Transmission Belts and Air Hose. It will probably save you money to talk over your needs with the G.T.M. To get in touch with him, drop a line to Goodyear, Akron, Ohio, or Los Angeles, California, or phone your nearest Goodyear Mechanical Rubber Goods Distributor.

THE GREATEST NAME IN RUBBER

GOODYEAR

BELTS • MOLDED GOODS • HOSE • PACKING

If you do not use or specify Tru-Lay Preformed Wire Rope it's probably because you do not know that Tru-Lay *costs more!*

● It is a fact that Tru-Lay Preformed Wire Rope *does* cost more than wire rope that is *not* preformed. *But* you will pay less for Tru-Lay service than what you pay for *non*-preformed rope service.

It is also a fact that the many users who have checked Tru-Lay service against that of *non*-preformed wire rope—even including our own "Crescent" rope—have proved to their own satisfaction that, *in the long run*, Tru-Lay costs far less. They have found that the longer life of Tru-Lay more than justifies its higher initial cost.

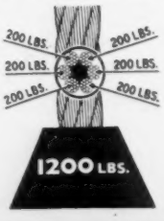
The ever-increasing sales of Tru-Lay as compared with "Crescent" and other *non*-preformed wire ropes furnish convincing proof that Tru-Lay gives greater dollar-for-dollar value—and that its *ultimate final* cost is *lower*.

• • •

Here are a few outstanding Tru-Lay advantages:

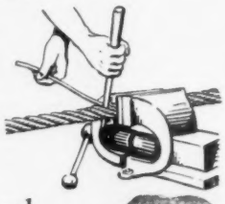
Preforming the wires and strands to their helical shape eliminates internal tension and reduces internal friction.

"High-stranding" and "low-stranding" are eliminated. Each strand carries its own share of the load.



Tru-Lay preformed wires and strands lie relaxed—they are not cranky—therefore resist kinking.

Tru-Lay requires no seizing, because of the absence of internal tension.



Where splicing is necessary, the strands fit into position between adjacent strands, thus making the job easier and quicker.

Costly shutdowns for repairs and replacements are reduced to a minimum, because of Tru-Lay's much longer service.

• • •

Tru-Lay Preformed Wire Rope is made in all sizes, grades, constructions and lays. Our engineers are ready to help you determine your requirements. Write for detailed information.

AMERICAN CABLE COMPANY, Inc.
WILKES-BARRE, PENN.
An Associate Company of the American Chain Company, Inc.
District Offices:
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San Francisco

ACCO

FROM AN ACTUAL PHOTO

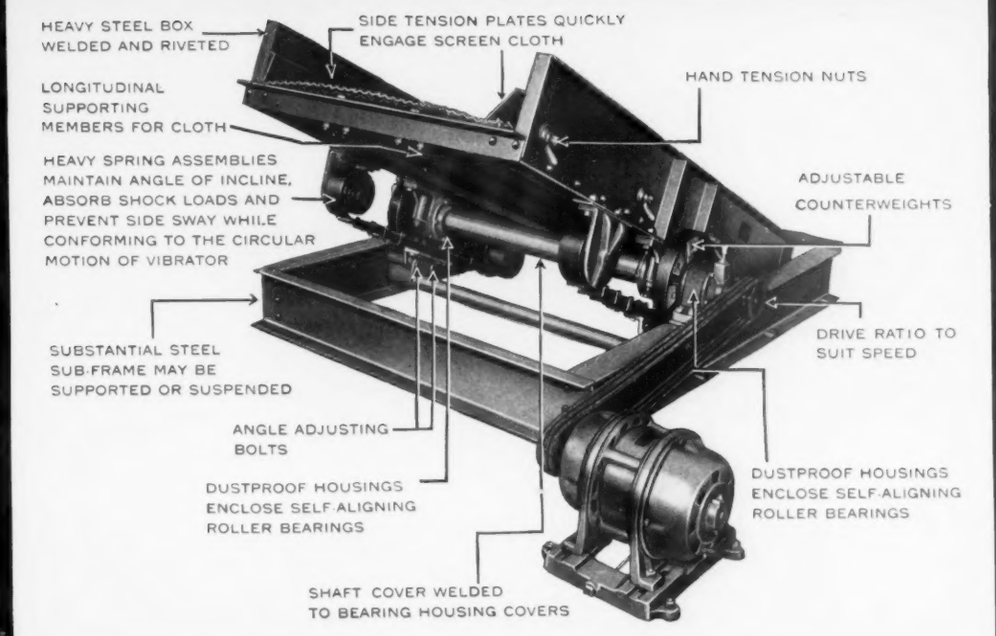
TRU·LAY *Preformed** Wire Rope

*PREFORMING IS A PATENTED MANUFACTURING PROCESS APPLICABLE TO ANY TYPE, GRADE, CONSTRUCTION AND LAY OF WIRE ROPE—WITH THE RESULT OF GREATLY INCREASING ITS SERVICE

FOR EFFICIENCY-SIMPLICITY-HIGH CAPACITY AND LONG LIFE

LINK-BELT

VIBRATING SCREEN


HEAVY STEEL BOX WELDED AND RIVETED
SIDE TENSION PLATES QUICKLY ENGAGE SCREEN CLOTH
HAND TENSION NUTS
LONGITUDINAL SUPPORTING MEMBERS FOR CLOTH
HEAVY SPRING ASSEMBLIES MAINTAIN ANGLE OF INCLINE, ABSORB SHOCK LOADS AND PREVENT SIDE SWAY WHILE CONFORMING TO THE CIRCULAR MOTION OF VIBRATOR
ADJUSTABLE COUNTERWEIGHTS
SUBSTANTIAL STEEL SUB-FRAME MAY BE SUPPORTED OR SUSPENDED
DRIVE RATIO TO SUIT SPEED
ANGLE ADJUSTING BOLTS
DUSTPROOF HOUSINGS ENCLOSE SELF-ALIGNING ROLLER BEARINGS
DUSTPROOF HOUSINGS ENCLOSE SELF-ALIGNING ROLLER BEARINGS
SHAFT COVER WELDED TO BEARING HOUSING COVERS

1 Mechanically operated with few moving parts, resulting in low operating and maintenance costs.

2 No dead screening areas. Method of imparting uniform intensity of vibrations, results in maximum efficiency, capacity and long life.

3 The screen cloth is entirely unobstructed, permitting free passage of material. Especially well adapted for the application of water sprays when washing, because of the uniform beds of material running down at a steady rate.

4 Angle of incline of screen can be readily changed to suit conditions.

5 Heavy combination coil and leaf spring assemblies maintain angle of incline, absorb shock loads and prevent side sway while conforming to circular motion of vibrator.

6 Only the screen cloth needs to be removed when cloth replacements are necessary. Simple and easy.

7 Mounted on substantial steel base which permits supporting below or suspension by cables from above. Readily fits into existing conditions requiring less space.

8 All bearings are exact duplicates of the self aligning roller type, enclosed in dust proof housings.

Send for This Book No. 1462

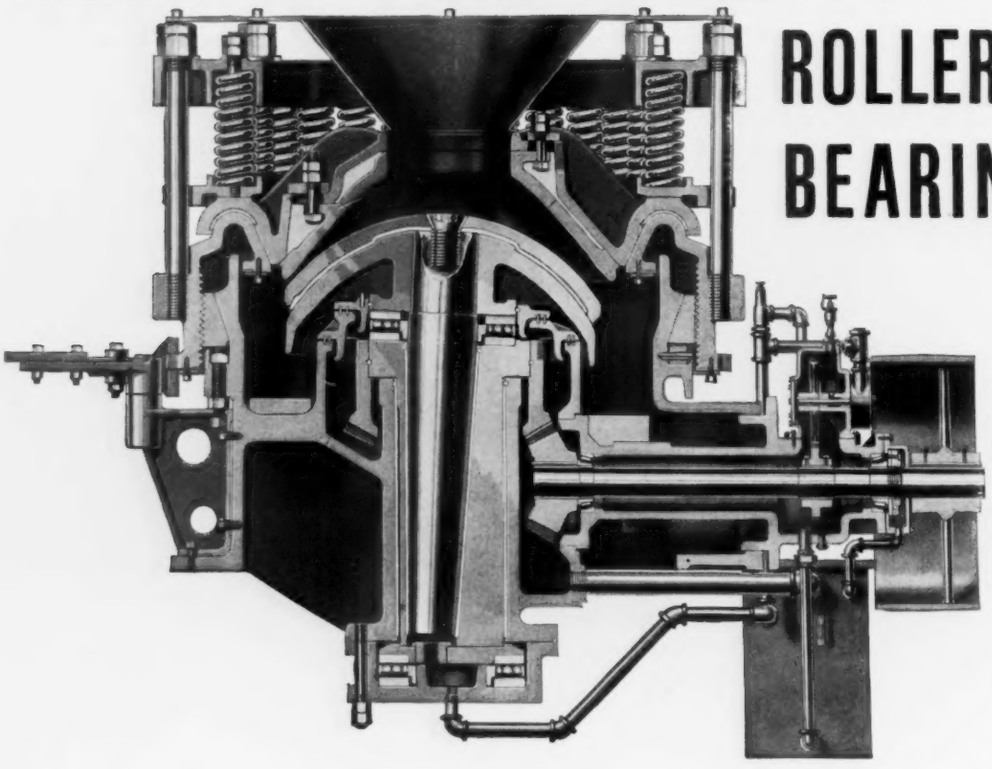
LINK-BELT COMPANY 5138

Leading Manufacturers of Equipment for Handling Materials Mechanically and Transmitting Power Positively

PHILADELPHIA . . . CHICAGO . . . INDIANAPOLIS . . . SAN FRANCISCO . . . TORONTO

Offices in Principal Cities

Why IS THE TELSMITH GYRASPHERE EQUIPPED WITH ROLLER THRUST BEARINGS?



In any type of crusher, the load is determined by the hardness of the rock, the volume of the feed and the ratio of reduction. The designing engineer can't reduce the work. He can only distribute it to the best advantage.

In the Telsmith Gyrasphere, the spherical shape of the head throws an unusual proportion of the load downward, to the bottom thrust bearing. This is as it should be. There is no bearing that will stand such heavy pressure and high speed as a roller thrust bearing. No bearing is so easy to lubricate. No bearing is so economical of power, so dependable under heavy duty. All of which has been amply demonstrated by the performance of roller step bearings in hydraulic turbines. Obviously then, this new distribution of pressures in the Telsmith Gyrasphere is a feature of major advantage, reducing the load on the shaft and eccentric.

But that's not all the story. The head and its dependent shaft are both supported on the eccentric, by means of a second roller thrust bearing. As bearing rotates, the wear is uniform and the supporting surface is always true. There is no stationary surface to wear unequally—to shift the load to some unexpected point. The head and shaft unit are always perfectly aligned—shaft breakages are eliminated, eccentric bearings last longer, lubrication is simplified and dirt is easily excluded from the oil-stream.

Result—when the user adds up his power and repair bills, HE KNOWS why the Telsmith Gyrasphere is equipped with roller thrust bearings. Write for Bulletin Y-15.

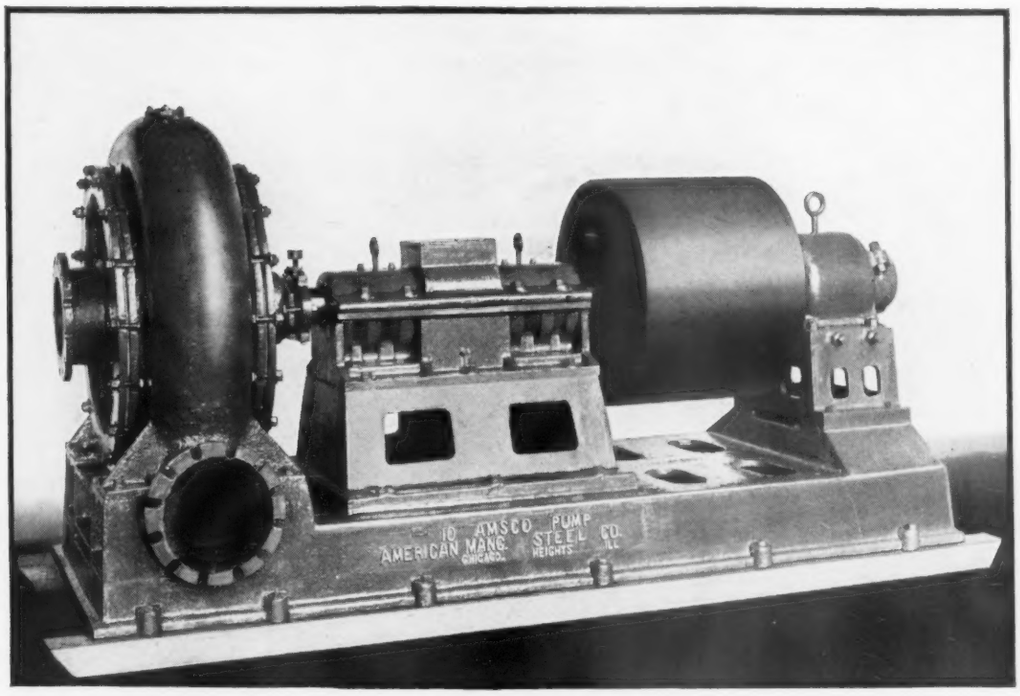
50 Church St. New York City	211 W. Wacker Drive Chicago, Ill.	130 S. 15th St. Philadelphia, Pa.
The K. S. Noble Co. Hartford, Conn.	1109 Statler Bldg. Boston, Mass.	Clark & Freeland, Inc. Baltimore, Md.
412 Westinghouse Bldg. Pittsburgh, Pa.	Milburn Mchy. Co. Columbus, Ohio	Borchert-Ingersoll, Inc. St. Paul, Minn.
Brandeis M & S Co. Louisville, Ky.	Graham B. Bright Richmond, Va.	Choctaw C. & M. Co. Memphis, Tenn.

SMITH ENGINEERING WORKS
504 East Capitol Drive — Milwaukee, Wis.

TELSMITH

AMSCO DREDGE PUMPS

TRADE MARK REGISTERED



10-inch AMSCO Type "M", Form 32 Pump, Belted Design. Right Hand, Bottom Discharge.

Embody—
DURABLE CONSTRUCTION AND LASTING EFFICIENCY

AMSCO Dredge Pumps reflect their ability to stand up when being pressed the hardest for production. They afford maximum protection against operation shutdowns.

AMSCO Dredge Pumps, in hundreds of installations, over a long period of years, have given satisfactory service, under every kind of working condition, at minimum cost per ton of material handled. It is thus that they have proved their superiority. Their use insures the highest, lasting, over-all efficiency, with minimum cost of repair parts and repair labor, together with the greatest number of productive operating hours. Users of AMSCO pumps will tell you this.

AMSCO Pumps embody: sturdiness with rigidity of construction; simplicity; unusually heavily proportioned shafts and bearings with maintained accuracy of shaft alignment; ample lubrication for bearings with free-flowing oiling facilities, together with large oil reservoirs; accessibility and quick, positive impeller adjustment; ease of replacement of wearing parts; and remarkably high capacity under severe head conditions.

All water end wearing parts are made of the analytically controlled, scientifically heat-treated AMSCO Manganese Steel, the "Toughest Steel Known," being unequalled for its shock and wear resistance qualities. These parts are of heavy proportioned design, accurately machine-finished by grinding where necessary, assuring correct fit when replacements are required. The combination assembly of the shell, side-plates and their removable liners, and the impeller, embodies distinctive AMSCO design features, providing easy flow passages which give maximum hydraulic efficiency and solids capacity, together with longest life wear service of parts.

The continued success of AMSCO Pumps is due to a policy of building with quality, assuring Durable Construction and Lasting Efficiency, and their correct installation by experienced engineers familiar with the problems involved in pumping abrasive materials.

AMSCO Pumps are built in standard 3-inch, 4-inch, 5-inch, 6-inch, 8-inch, 10-inch, 12-inch, 16-inch, and 18-inch sizes for all types of drives.

We invite your inquiry for performance data and details on the type of AMSCO pump best suited to your operations. ●

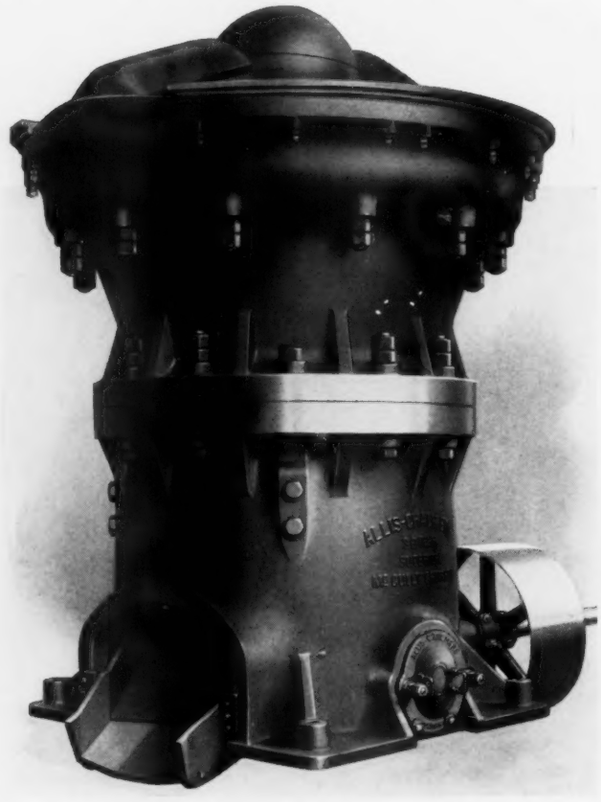
AMERICAN MANGANESE STEEL COMPANY
396 East 14th Street, Chicago Heights, Ill.
Offices in Principal Cities

In sand and gravel plant equipment you can best combat rapid wear due to abrasion and breakage due to shock by using cast parts of Amsco manganese steel. We will be glad to furnish detailed information on request. Send complete details of your requirements with inquiry.

The Type of Crusher
. . . . *to Suit Your Needs*

ALLIS-CHALMERS MANUFACTURING COMPANY has developed a line of crushing plant machinery which, with study and selection, will meet every possible combination of the varying factors of crushing plant operation in the most economical manner. As manufacturers of gyratory, jaw and roll type crushers, Allis-Chalmers is in a unique position; not being primarily interested in pushing the sale of any one of these types in preference to the others, our primary interest is always to help our customers solve their rock crushing problems in the most economical way.

Newhouse Crusher



36″ Superior McCully Crusher

TWO types of Allis-Chalmers crushers are illustrated here. The Superior McCully type (above) is the original short, heavy shaft gyratory greatly improved by constant development. The crusher is of rugged construction to withstand severe service. The lubricating system is simple and reliable and the eccentric dust seal is of an improved design. Built in many sizes from 8″ to 60″. (*Described in Bulletin 1472.*)

The Newhouse Crusher (left) meets every requirement of secondary crushing. It is a high reduction, large capacity unit with motor direct connected to drive shaft, and is well suited to fit into present installations. It requires little head room and may be suspended from the frame work of a building by cables. Built in four sizes, 5″, 7″, 10″ and 14″. (*Described in Bulletin 1469-C.*)

Bulletin 1473, just printed, describes the complete Allis-Chalmers line of crushing plant machinery. Write for your copy.

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee

The Type 801 is a rugged, heavy duty 2 yard convertible shovel, dragline, and crane, embodying features that make possible low cost yardage. It has pep, speed, and mobility that are not ordinarily found in a machine of this size.

The compact design affords exceptionally short tail swing. Only one car is required for shipment. The boom is of box type construction, electrically welded throughout---no rivets or bolts are used in its construction. The chain crowd is independent of other motions. Drums have extra large diameters, which are responsible for the remarkable cable economy. The main machinery, including cone rollers, is equipped with roller bearings. This feature promotes frictionless action, assures perfect alignment of shafts and reduces upkeep expense. All gears are helical cut for smooth, quiet and long life operation. An electric starter within easy reach from the operator's position is standard equipment. All major motions are independent--an important feature when the machine is used as a crane.

The type 801 shovel can be easily and quickly converted in the field into a dragline or crane. When equipped as dragline it will effectively handle a three yard bucket.

For complete details write for a copy of Bulletin No. 81.

THE OHIO POWER SHOVEL CO., Lima, Ohio, U.S.A.

DIVISION OF LIMA LOCOMOTIVE WORKS, INCORPORATED

NEW YORK 167th St. and Sedgwick Avenue | CHICAGO 1543 Straus Bldg. | NEWARK, N. J. 317 Frelinghuysen Avenue | SEATTLE 2244 First Ave. So. | DALLAS 1303 So. Lamar St. | MEMPHIS 77 McCall Street | The General Supply Co. of Canada, Ltd. Ottawa, Ont. | Tyee Machinery Co. Ltd. Vancouver, B. C.

SHOVELS
CRANES
DRAGLINES
HOES

LIMA

CAPACITIES
3-4 YARD 1 YARD
1 1-4 YARD
1 1-2 YARD
1 3-4 YARD
2 YARD

In WILLIAMSPORT WIRE ROPE You'll Find the Ultimate of REAL SERVICE !

In the use of Williamsport "Purple Strand"—the strongest of Williamsport's line — you will generally find: records of performance under tough conditions, a longer period of real service based on actual comparison in the field, a consistently uniform yardage handled by each rope—a characteristic that most good engineers look for and a warehouse stock located near you.

On your next replacement—take advantage of these benefits—insist on "Purple Strand"—give it a chance to prove its merit — the results will please you as they have others.

Write us today for prices.

Williamsport WIRE ROPE COMPANY

Main Office and Works
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122 So. Michigan Ave.
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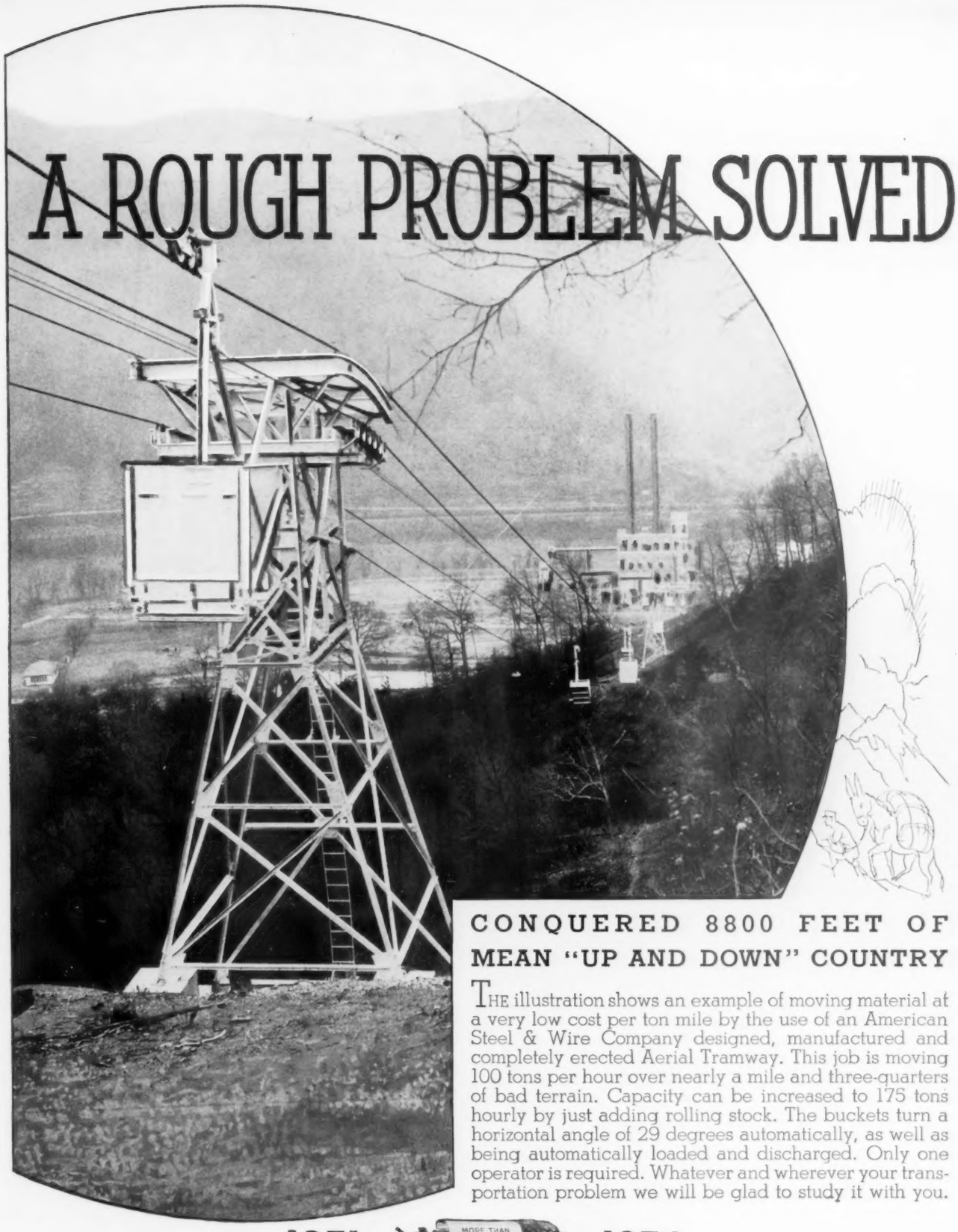
A ROUGH PROBLEM SOLVED



CONQUERED 8800 FEET OF MEAN "UP AND DOWN" COUNTRY

THE illustration shows an example of moving material at a very low cost per ton mile by the use of an American Steel & Wire Company designed, manufactured and completely erected Aerial Tramway. This job is moving 100 tons per hour over nearly a mile and three-quarters of bad terrain. Capacity can be increased to 175 tons hourly by just adding rolling stock. The buckets turn a horizontal angle of 29 degrees automatically, as well as being automatically loaded and discharged. Only one operator is required. Whatever and wherever your transportation problem we will be glad to study it with you.

1831 — MORE THAN 100 YEARS OF PROGRESS IN WIRE MAKING — 1934

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago
94 Grove Street, Worcester

SUBSIDIARY OF UNITED STATES STEEL CORPORATION
AND ALL PRINCIPAL CITIES

Empire State Building, New York
First National Bank Building, Baltimore

Pacific Coast Distributors: Columbia Steel Company, Russ Bldg., San Francisco

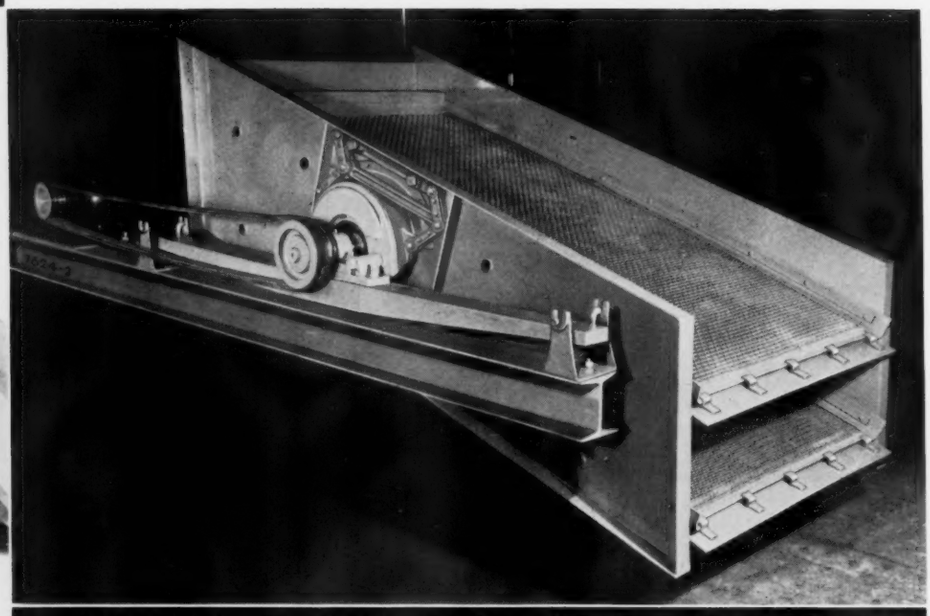
Export Distributors: United States Steel Products Company, New York

A New S-A Portable Belt Conveyor

This lightweight portable belt conveyor is the latest development in conveyors that are really portable. It is exceptionally rigid and is sturdy enough for everyday use anywhere. Every superfluous pound has been eliminated—a new lighter and stronger hoisting rig has been developed with a fast, rapid-acting ratchet winch for raising and lowering. The conveyor is 18″ wide and is made in standard lengths of from 25 to 40 feet. It has the new lightweight S-A carriers or idlers with sealed Timken bearings and pressure lubrication. This new S-A Portable has many additional features and is made in two models, one built of steel and another constructed almost entirely of aluminum and tempered aluminum alloys that are as strong as steel and reduce the total weight over 40%. Write for details on these lightweight S-A Portables.

Write Today
For Information on
S-A Vibrator Screens
S-A Belt Conveyors
Lightweight Portables.

S-A VIBRATOR SCREENS



WITH POSITIVE VIBRATION

S-A Vibrator Screens have every detail necessary for accurate screening, high capacity, long life and low operating cost.

To meet the countless screening problems confronting producers, S-A engineers have built Vibrator Screens in two styles. One is recommended for every normal screening service handling unsized materials up to 2½ inches. The second style is built for the heaviest scalping and screening duty that can be asked of a vibrating screen.

Many other features such as: well protected, self-aligning ball and roller bearings; inexpensive, reversible screen panels; simple mechanical stabilizer and the choice of suspended sub frame or direct mounting with cradle spring supports (shown above) make S-A screens an outstanding value for accurate, low cost screening. Write for folders describing these two S-A Vibrator Screens.

STEPHENS-ADAMSON MFG. CO.
59 Ridgeway Ave. **Aurora, Illinois**
Plants at: Aurora, Ill.—Los Angeles, California—Belleville, Ontario

S-A CONVEYOR PRODUCTS

Flash DRYING SYSTEM with the Raymond KILN MILL

THIS faster method of drying *while pulverizing* offers some important new advantages:

Widens the range of use of the Kiln Mill
Removes higher percentages of moisture
Permits closer control over the product
Gives increased economy of manufacture

Materials with a moisture content up to 65% can be rapidly dried and ground to a powder of specified dryness and fineness in *one* operation. No separate dryers are necessary. This impact type mill reduces the material to an extremely fine, uniform product. As the material is broken down to powder, hot air is passed through the system, absorbing the moisture and venting it with the excess air.

As a comparison: In dehydrating a mud-like substance by ordinary methods, the time of passage through a dryer averages 40 minutes, while only *ten seconds* is required by the Kiln Mill to reduce the material to a bone-dry powder.

The Raymond Flash Drying System is showing remarkable results in pulverizing marl and reducing the moisture from 30% down to one per cent—grinding soft limestone for agricultural fertilizer and reducing moisture from 20% to less than 5%—dehydrating and disintegrating a washed clay by high temperature drying.

If you can use the Kiln Mill on your product, it means vastly lower costs—for installation, operation and production. Tell us your requirements.

Hammer-type Kiln Mill equipped with the Flash Drying System. For complete details, write for the RAYMOND BULLETIN OF KILN MILLS

RAYMOND BROS. IMPACT PULVERIZER CO.
1321 North Branch Street, Chicago
Sales Offices: New York and Los Angeles

PULVERIZING, SEPARATING, AIR DRYING AND DUST COLLECTING EQUIPMENT

Do You Go Through a File of Catalogs Like THIS - - - - -

When You Can Get Information on All Types of Equipment In THIS ?

Can you always find what you want when you are looking for equipment? Is your catalog (FILE OR PILE) arranged so you can always quickly locate manufacturers and their products?

A survey of producers shows three common methods of keeping this all-important information:

1. A scattered (FILE OR PILE) such as illustrated above with all shapes and sizes that will fit in no filing case made and where it would take hours to locate desired catalogs (if they have not been thrown away).

2. An alphabetical file of catalogs, but with little attempt to file by product except in the producer's memory, and how seldom that is complete! Sometimes Pit and Quarry Handbook is used as a key to this file.

3. Pit and Quarry Handbook alone with its cross filing by products, and their descriptions in the catalog advertisements. Sometimes the Handbook is augmented by three or four catalogs of "favorite" manufacturers.

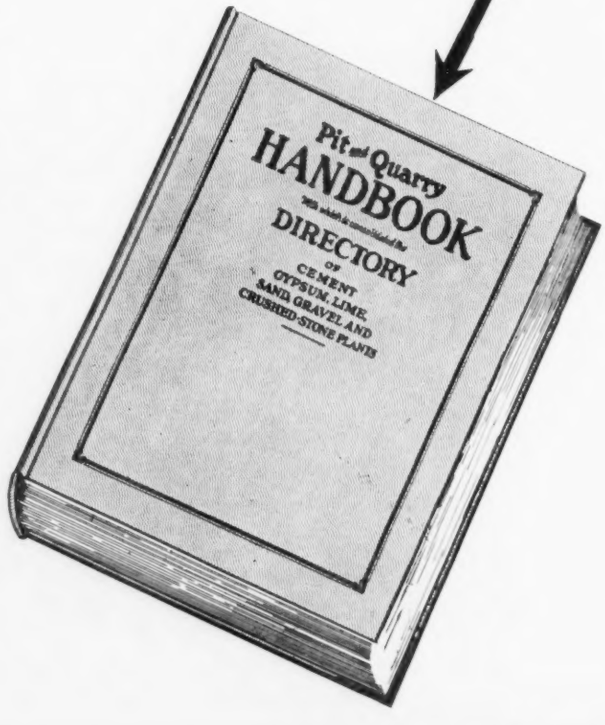
***Use your Handbook*—when you need information quickly about equipment.**

***Use your Handbook*—when you have production problems.**

***Use your Handbook*—when you want information about producers.**

***Use your Handbook*—always—it is unusually complete—is modern and convenient.**

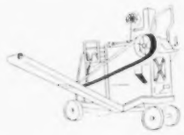
If you do not have a copy, or need another copy, the cost is $10. Write to



Pit and Quarry Publications

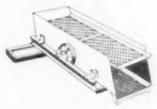
538 S. Clark St. Chicago, Ill.

THE CEDAR RAPIDS LINE
OF MATERIAL HANDLING EQUIPMENT



Vibrator Equipped
One Piece Outfit
6 Sizes

Two Unit
Rock Plant
7 Sizes



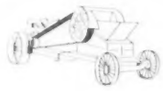
Vibrator Screens
All Sizes

Traveling Plant
Road Mix.
Asphalt Plants
1-1½ or 2 Ton

Straight Line Plant
With Revolving Screen
6 Sizes

Primary Crusher
On Trucks
3 Sizes

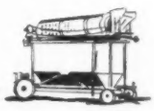
Straight Line
"All Purpose" Plant
Vibrator Equipped
6 Sizes



Tractor-Crusher
Combinations.
Trailer Units

Crusher on Extended
Skids with Elevator
8 Sizes

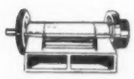
Bucket Elevators
All Sizes and Lengths



Bins and
Bin Trucks
All Sizes

Power Units
From 2 to 200 H. P.

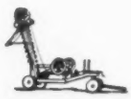
Drag Scraper Hoist,
Buckets and Accessories



336 Heavy Duty
Reduction Crusher

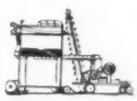
One Piece Outfit
Standard O. P. O.
7 Sizes

Revolving Screens
Light and Heavy Type.
Scrubbers



Portable Crushers
With Bucket Elevators

Portable
Loading Conveyors



Portable Stone
Sizing Plants
7 Sizes

Portable Screening
and Loading Plants
6 Sizes

MANUFACTURED BY THE

IOWA MANUFACTURING CO.—Cedar Rapids, Ia.

"Performance Is What Counts"

CATALOGS MAILED UPON REQUEST

The Sale of

MORE THAN 20,000,000 ATLAS ACCORDION FOLDS is the best proof of acceptance

Genuine ATLAS Accordion Fold Electric Blasting Caps were announced last year with these

PROVEN ADVANTAGES

CONVENIENCE | SAFETY | ORIGINALITY | PRACTICAL USEFULNESS

all at no extra cost to the user

ASK THE ATLAS MAN TO SHOW YOU

Specify ***Genuine*** Atlas Accordion Fold Electric Blasting Caps and Electric Squibs. Orange tubes for Iron wires. Green tubes for Copper wires.

ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

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Allentown, Pa.	Houghton, Mich.	Memphis, Tenn.	Pittsburgh, Pa.	Spokane, Wash.
Boston, Mass.	Joplin, Mo.	New Orleans, La.	Portland, Oregon	St. Louis, Mo.
Butte, Mont.	Kansas City, Mo.	New York, N. Y.	Salt Lake City, Utah	Tamaqua, Pa.
Denver, Colo.	Knoxville, Tenn.	Philadelphia, Pa.	San Francisco, Calif.	Wilkes-Barre, Pa.
	Los Angeles, Calif.	Pittsburg, Kansas	Seattle, Wash.	

ATLAS

EXPLOSIVES

VOLUME 27 NUMBER 5

Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

CHICAGO, NOVEMBER, 1934

Aggregates Meet Goes to Chicago Next Year

MACHINERY EXHIBIT RESUMED

The Nineteenth Annual Convention of the National Sand & Gravel Assn. will be held at the Palmer House, Chicago, Ill., the week of January 27, 1935, concurrently with the annual meetings of the National Crushed Stone Assn., the National Slag Assn. and the Code Authority of the three industries. An important feature will be a renewal of the machinery exposition sponsored jointly by the Manufacturers' Divisions of the stone and gravel associations.

The sessions are being scheduled so that each organization will have adequate time to transact its business and discuss its special problems. A brief outline of the schedule follows:

Jan. 27.—Independent meetings of the boards of directors of the three associations.

Jan. 28.—Meeting of the Code Authority and opening of the machinery exposition.

Jan. 29.—Open meeting for all members of the three industries for a discussion of code problems; sponsored by the three associations.

Jan. 30.—Independent meetings of the three associations.

Jan. 31.—Independent meetings of the boards of directors of the three associations and, in the evening, a joint banquet for all members of the three industries.

Feb. 1.—Meeting of the Code Authority or of the Executive Committee or of the Executive Council of the Code Authority.

A committee consisting of Messrs. V. P. Ahearn, J. R. Boyd, H. A. Love and Stanton Walker, representing the Code Authority and the three associations, has been appointed to work out details of the program and speakers. The representatives of each association will, of course, have jurisdiction over details pertaining to their association above.

New Oregon Gravel Plant Now in Full Operation

★ The new sand-and-gravel plant of the General Construction Co., Portland, Ore., went into operation recently. The plant is located at Independence, Ore., and will supply sand and gravel for the company's work on the Bonneville dam and the Newport bridge. Its capacity is 60 carloads of material daily. The plant was built by Evan Phillips, Portland, and its estimated cost was $75,000.

Government Considers Puerto Rico Cement Plant

According to Major Edwin Eckel, chief geologist of the Tennessee Valley Authority, a 200,000 bbl. capacity cement plant may be erected by the government in Puerto Rico. Major Eckel is commencing a study of the mineral resources of Puerto Rico and will report on the economic possibilities of the enterprise, one of several he says he believes the island could develop in a carefully planned industrial program. Normally the island imports 400,000 bbl. of cement annually, the United States Government being the largest purchaser.

New Rock-Asphalt Plant Nears Completion in Ohio

★ A rock-asphalt quarry five miles northwest of Hillsboro, Ohio, was opened recently by Myers & Dietrich. A $45,000 plant for handling the product is being erected. S. F. Ferguson, formerly chief engineer of the Kentucky Rock Asphalt Co., is in charge of the work.

Road Builders Will Hold Convention in Capital

The 32nd annual convention and highway exhibit of the American Road Builders' Assn. will be held in Washington, D. C., January 22 to 25, 1933, according to an announcement by Capt. H. C. Whitehurst, president of the association. The headquarters of the convention and exhibit will be in the Willard Hotel. The theme of the convention will be: The continuation of an adequate highway program; the use of highway revenues for highway purposes—no diversions; the continuation of Federal appropriations for highway construction.

★ The Momence Stone Products Co., recently organized, has started the installation of machinery in its new plant at Kankakee, Ill. The plant will have a capacity of 600 tons of crushed stone a day and will also produce agricultural limestone.

Cement Plants Reopen to Replenish Stocks

OTHER REOPENINGS SCHEDULED

Indications seem to point to a very slight decrease in the production of cement in the month of October unlike past years when production usually began to fall off rapidly in that month. A number of plants have shut down for the season but they seem to be outnumbered by plants which resumed operations during October because of the rapid depletion of their stocks. The plants which have recently resumed operations include the Lehigh Portland Cement Co., Iola, Kans., and Metaline Falls, Wash.; Signal Mountain Portland Cement Co., Chattanooga, Tenn.; San Antonio Portland Cement Co., Cementville, Tex.; Lone Star Cement Co., Kansas, Bonner Springs, Kans.; Universal Atlas Cement Co., Buffington, Ind.

Among other plants scheduled to reopen soon is that of the Universal Atlas Cement Co., at Duluth, Minn., which has been closed for two months. According to an announcement, this plant will reöpen Nov. 15 to replenish its stock and to supply cement for use on the Fort Peck Dam near Wiota in eastern Montana.

United States Gypsum Buys Dittlinger Lime

The United States Gypsum Co. has purchased the Dittlinger Lime Co., New Braunfels, Texas, according to Alfred Liebscher, president of the Dittlinger Industries. Hereafter the plant will be known as the Dittlinger Lime Co. Division of the United States Gypsum Co. Operations of the plant will be expanded, according to Mr. Liebscher and very little change will be made in the management and employees.

New Pigment Plant Building in New Jersey

★ The Titanium Pigment Co., Inc., Spotswood, N. J., announces the recent purchase of a Sturtevant separator to be installed in its new titanium pigment plant which is now under construction at Sayreville, N. J.

TVA Abandons Idea of Manufacturing Cement

SOUTHERN MILLS GET ORDERS

The Tennessee Valley Authority has awarded contracts for 1,500,000 bbl. of cement and has thus put an end to the fears of cement manufacture by the government. The decision to purchase was announced by Arthur E. Morgan, chairman of the T.V.A., on Oct. 15. The 800,000 bbl. of cement required for Norris Dam was bought at $1.738 a bbl. and the 700,000 bbl. for Wheeler Dam at $1.8798 a bbl. The orders were given to Southern mills.

In explaining the T.V.A.'s change of attitude, from that of a possible competitor in manufacture to that of purchaser, Dr. Morgan said:

For several months the T.V.A. and the cement industry have conferred, first to determine what is a fair price for cement, and second, what it would cost the T.V.A. to make cement on the Tennessee River at Sheffield, Ala., where both raw materials and cheap power are exceptionally available, and what it would cost to ship it by cheap water freight to the dam sites on the river.

The T.V.A. and the cement industry did not come to full agreement, either on a fair price for cement or on the cost of making cement at Sheffield. There was fairly complete agreement as to direct manufacturing costs, the principal differences being on such items as interest, depreciation and selling costs. The T.V.A. was willing to pay more than it believed to be the probable cost of making cement at Sheffield and delivering it to the dam sites, rather than to construct and operate an additional plant in an already overbuilt industry.

The T.V.A. believes that the price it is willing to pay is reasonable and fair under all the circumstances. The cement manufacturers, on the other hand, rather than have another plant built, have bid prices which they hold are less than fair prices, especially at the low rate of production now prevailing in the industry, and they have met the maximum price which the T.V.A. was willing to pay.

The T.V.A. had asked for bids on Type B Portland cement, for which the following specifications were set: Chemical composition—tricalcium-silicate ($3CaO.SiO_2$) not less than 35 nor more than 55 per cent.; tricalcium-aluminate ($3\ CaO.Al_2O_3$) not more than 8 per cent. Fineness—not less than 1,600 nor more than 2,200 sq. cm. per gram as shown by the Wagner Turbidimeter.

The contracts under which the successful bidders will furnish cement contain provisions for adjusting prices in accordance with changing costs and a copy of the President's Executive Order of June 29 permitting bidders to quote the government prices 15 per cent. lower than those filed or quoted to commercial customers.

Within ten days after the awarding of the contracts each successful bidder must furnish to a firm of certified public accountants designated by the T.V.A. and approved by the bidder the following facts regarding the operation of the plant, in which the cement to be furnished will be made, for the nearest calendar month preceding Oct. 1, 1934, through which the plant was in operation:

(1) *Labor.*—(a) The number of man-hours required to produce one barrel of cement.—(b) The contractor's (cement manufacturer's) average labor rate in cents per hour.

(2) *Fuel.*—(a) The number of pounds of coal or standard units of other fuel required per barrel.—(b) The contractor's cost, in cents per pound, of coal or standard units of other fuel delivered to the plant.

(3) *Raw Materials.*—(a) The number of pounds of purchased raw materials, as defined above, required per barrel.—(b) Contractor's cost, in cents per pound, of purchased raw materials, as defined above, delivered to the plant.

(4) *Power.*—(a) The number of kw-hr. of purchased power required per barrel.—(b) The contractor's cost in cents per kw-hr. of power delivered to the plant.

Upon receiving the above information from all contractors the said accountants shall, under their certificate, furnish to the Authority, within 10 days after the making of the awards: (1) a computation showing the average for all contractors of the above Items 1 (a), 2 (a), 3 (a), and 4 (a); and (2), the information called for by the above Items 1 (b), 2 (b), 3 (b), and 4 (b) for each plant of each contractor from which shipments of cement will be made. The applicable computation for each contractor (hereinafter referred to as "the schedule") shall be annexed to and made a part of his contract.

The schedule so determined shall be used as a basis for future price adjustments. If during the period while the contract is in effect, the contractor's cost of manufacture is increased or decreased by reason of changes in Items 1 (b), 2 (b), 3 (b), and 4 (b), an adjustment in the price of cement furnished after Jan. 1, 1935, shall be made in the net total sum of said increases and decreases in costs.

Items 1 (a), 2 (a), 3 (a), and 4 (a) shall be multiplied, respectively, by the net changes (at the contractor's plant from which cement is supplied under the contract), in cents per item in Items 1 (b), 2 (b), 3 (b), and 4 (b) of said schedule, and the algebraic sum of the resulting products shall be the increase or decrease per barrel to be applied to the contract price. No changes in the contract price of cement shall be made unless the increase or decrease shall equal or exceed 5 c. per bbl., and no change shall be deemed to have occurred in Item 1 (b) unless the rates of pay for given labor classifications shall have been increased or decreased, such latter fact to be determined by the accountants acting under this provision.

The contractor, at any time, may notify the T.V.A. in writing of any increase in his cost of manufacture due to changes in Items 1 (b), 2 (b), 3 (b), and 4 (b), indicating specifically: (1) the elements of cost said by him to have increased since Oct. 1, 1934, and the amount thereof; (2) the date when any such element of cost is said to have increased; (3) the period during which said increase has prevailed; and (4) the change of price of cement deemed necessary by him to compensate for such increase in his cost of manufacture.

Upon receipt of such notice the T.V.A., in its discretion, may make the price adjustment requested, or may have the aforementioned accountants (or other accountants designated by it, and approved by the contractor) ascertain the facts upon which the request for price change is based. For such purpose the accountants must be permitted by the contractor to verify the statements set forth in the contractor's request for price adjustment, and under their certificate report to the T.V.A. whether the contractor's cost of manufacture has increased, as determined in accordance with the above formula. The report must indicate the date as of which such increase became effective and the period of time during which it prevailed. Upon receipt of a report certifying such increase the T.V.A. must make an adjustment in price retroactive to the date specified by the accountants. The cost of the original audit made by the accountants and any further audits made by them in connection with requests for price increases is borne by the contractor.

The T.V.A. is entitled to a reduction in the price of cement on account of any decrease in the contractor's cost of manufacture, as determined in accordance with the above formula and, upon asserting a claim therefor, the T.V.A. is entitled to receive from the contractor, within 10 days after notice to the contractor, a statement from the contractor setting forth as the date of receipt of such notice: (1) the information specified above in Items 1 (b), 2 (b), 3 (b) and 4 (b); (2) the date when any of said items of cost decreased; and (3) the period during which such decrease has prevailed. The T.V.A. at its option is further entitled at its own expense to have the facts pertinent to such statement verified, and the matter of a price adjustment determined, by accountants.

The contractor must furnish to the T.V.A. within 10 days after Jan. 1, April 1, July 1, and Oct. 1 of each year, a report showing 1 (b), 2 (b), 3 (b) and 4 (b) covering the last full month of operation preceding the period covered by the report. Adjustments in price due to decreases in the contractor's cost of manufacture as determined in accordance with the foregoing formula must be retroactive to the date of such decrease, and deducted by the Authority from the payments made.

Florida's First Dolomite Mine Opened at Lebanon

★ The Dixie Lime Products Co., Ocala, Fla., has opened what is said to be the first dolomite mine in that state at Lebanon, Levy County. According to W. M. Palmer, president, the deposit is estimated to contain several million tons of material averaging 95 per cent. purity. About 30 men are now employed on this project.

Cement-Mill Coal Use Was 346,782 Tons in Aug.

As summarized from the reports of the cement producers supplemented by a few estimates, the following quantities of fuel were consumed at the Portland-cement plants in the United States in the month of August, 1934, in the production of 7,863,000 bbl. of finished cement: Coal, 346,782 short tons; oil, 167,110 bbl. (or 7,018,620 gal.); and natural gas, 2,299,586,515 cu. ft. The producers also reported 261,427 short tons of coal in stock at the mills at the end of August, 1934.

Corresponding figures from the producers' reports for July, 1934, are as follows: Finished cement produced, 8,134,000 bbl.; and fuels consumed in its manufacture—coal, 370,480 short tons; oil, 151,792 bbl. (or 6,375,264 gal.); and natural gas, 2,857,336,372 cu. ft. The producers also reported 281,294 short tons of coal in stock at the mills at the end of July, 1934.

In addition to the above fuels, one plant in July and August reported the use of coke-oven gas, and two plants in both months reported the use of petroleum coke. The plants reporting the use of petroleum coke also reported the use of other fuels.

September Contracts Slightly Under 1933

FIRST 9 MONTHS EXCEED 1933

The volume of new construction projects started in the 37 eastern states during September reached a total of $110,219,200 according to the contract records of F. W. Dodge Corp. This total represents a loss of more than 8 per cent. when compared with the August volume of $120,014,600 and approximately the same percentage decline from the September, 1933, total of $120,134,400.

An examination of the construction classes indicates no pronounced decline in any specific type of building. Residential building contracts awarded during the month totaled $17,871,600, as compared with $18,641,000 for August and $21,549,000 for September of last year. Non-residential building during the month amounted to $42,359,300 as contrasted with $50,816,900 for the preceding month and $37,836,300 for the corresponding month of last year. Public works, with increased highway work, showed an actual increase over August, the totals amounting to $43,478,500 and $41,905,900 respectively.

The cumulative totals for the first nine months of this year in each of the 10 major classes of construction show material gains when compared with the corresponding period of last year. In fact the cumulative total for all types of construction, amounting to $1,203,952,100 is almost equal to the total for the entire year 1933 and exceeds the nine months total of last year by more than 62 per cent. Non-residential building with a total amounting to $432,259,200 shows a gain of more than 46 per cent. over the corresponding 1933 total of $294,921,000. The public works total for the year to date is more than twice the total for the corresponding nine months of last year with contracts amounting to $491,444,400 and $210,420,600 respectively. Gains of this year over last year amounted to more than 66 per cent. in the public utilities classification and to more than 4 per cent. for residential building.

Hold Uniform Credit and Sales Terms Hearings

Several district committees of the crushed-stone, sand-and-gravel and slag industry (Code No. 109) have asked for approval of uniform terms of sale and uniform credit practices. The following hearings have recently been held:

October 10—District of Columbia and districts of Maryland, Virginia and West Virginia (all in Region 4).

October 16—North Carolina and western and central Tennessee (all in Region 6); District 3 of Minnesota (part of Region 1); and Districts 1 and 2 of Colorado (part of Region 14).

October 18—Districts 1, 2, 3, 6, 7 and 8, covering Arkansas, Texas and Northern Louisiana (all in Region 7).

New Jersey Cement Plant Suffers Heavy Fire Loss

Fire destroyed the pattern storage building and carpenter shop at the plant of the Edison Portland Cement Co. at New Village, near Phillipsburg, N. J., on October 23. Plant officials estimated the loss at $60,000, most of which was due to the destruction of valuable patterns stored in the two-story building. The loss is covered by insurance.

★ General Refractory Products, Ltd., Toronto, Ont., is reported to be erecting a plant at Kapuskaeing in northern Ontario for the manufacture of a range of products, using local deposits of fire clay, feldspar and silica sand.

Material Purchases of PWA Decline in July

TEN-MONTH TOTAL IS $96,634,168

Nearly $100,000,000 had been spent for nonmetallic minerals and their products by the Public Works Administration in the 10 months ended July 15, 1934. Of the total of $96,634,168 so expended, $63,314,767 had been spent on public-roads projects and $33,319,401 on P.W.A. projects other than roads. Only the expenditures for the latter type of projects have been itemized by kind of material. Of the 10-month total of $33,319,401, $10,175,965 went for cement; $4,955,360 for sand and gravel; $5,542,297 for marble, granite, slate and other stone products; $4,802,805 for concrete products; and $1,789,300 for paving materials and mixtures. The expenditures for other materials are given in the accompanying table.

In July cement purchases ranked first with $1,492,182, sand and gravel second with $800,430, and crushed stone ninth with $139,756. These three materials account for a large share also of the month's public-roads-projects expenditures, of which it is estimated that $9,045,000 was spent for nonmetallic minerals and their products.

Arkansas Stone Producer Purchases Asphalt Plant

The Big Rock Stone & Material Co. has purchased the Amiesite asphalt plant at Fifteenth and Pikes Av., North Little Rock, Ark., it is reported. Operation of this cold-mix plant was to have started about October 1.

★ The Spokane Portland Cement Co., Spokane, Wash., is completing a program of improvement at its plant there. Among other equipment installed was a Shaffer Poidometer.

NONMETALLIC MINERALS AND THEIR PRODUCTS PURCHASED FOR PUBLIC-WORKS PROJECTS IN 1933 AND 1934, BY MONTHS

Material	Month Ended												Totals (10 months)
	Oct. 15, 1933	Nov. 15, 1933	Dec. 15, 1933	Jan. 15, 1934	Feb. 15, 1934	Mar. 15, 1934	Apr. 15, 1934	May 15, 1934	June 15, 1934	July 15, 1934	Aug. 15, 1934	Sept. 15, 1934	
Cement	$71,373	$366,384	$361,635	$370,668	$444,559	$371,665	$1,264,718	$ 831,238	$4,601,543	$1,492,182	.....	.....	$10,175,965
Sand and gravel	13,164	107,453	313,009	283,483	289,677	240,309	328,075	1,797,504	792,256	800,430	.....	.....	4,955,360
Crushed stone	90,301	23,074	40,880	56,675	19,517	31,383	85,604	56,068	94,896	139,756	.....	.....	638,154
Marble, granite, slate and other stone products	38,787	403,924	1,713,412	513,900	368,201	209,684	401,386	620,183	650,572	622,248	.....	.....	5,542,297
Clay products	39,735	152,717	254,685	260,434	234,522	327,051	426,879	509,865	567,847	742,762	.....	.....	3,516,497
Concrete products	19,059	644,544	703,572	517,354	412,052	351,284	392,902	501,824	637,880	622,334	.....	.....	4,802,805
Glass	.....	.....	18,254	72,068	.....	11,384	29,421	41,152	28,658	35,977	.....	.....	236,914
Paving materials and mixtures	43,244	178,268	135,289	133,857	113,870	138,865	297,062	205,603	241,747	301,495	.....	.....	1,789,300
Roofing, asphalt shingles, etc.	.....	53,595	39,261	74,919	53,009	229,370	132,024	120,501	121,928	159,254	.....	.....	983,861
Wall plaster, wall board, etc.	.....	.....	14,935	32,814	73,021	56,062	85,671	114,202	143,355	148 188	.....	.....	668,248
Totals	$315, 663	$1,929,959	$3,594,932	$2,316,172	$2,008,428	$1,967,057	$3,443,742	$4,798,140	$7,880,852	$5,064,626	.....	.....	$33,319,401
Public roads projects[1]	(2)	(2)	(2)	2,819,250	2,857,500	3.330,000	4,950,000	7,650,000	12,150,000	9,045,000	.....	.....	63,314,767
Grand totals	(3)	(3)	(3)	$5,135,422	$4,865,928	$5,297,057	$8,393.742	$12,448,140	$20,030,682	$14,109,626	.....	.....	$96,634,168

[1] Not available by type of material. These figures represent 45 per cent. of the totals, as approximately that portion is spent for cement and aggregates.
[2] Not available for this month separately but included in comulative total.
[3] See Note 2.

Safety Meetings Hold Producers' Interest

ATTENDANCE UNUSUALLY GOOD

The Cement and Quarry Sections of the National Safety Council conducted very satisfactory meetings in connection with the Twenty-third Annual Safety Congress and Exposition of that body held at the Carter, Statler and Cleveland Hotels, Cleveland, O., Oct. 1 to 5.

The Tuesday morning cement session was called to order by J. B. Zook, chairman, who extended a cordial welcome to those present and remarked about the fine attendance. In his paper, *Our Work—To-day and To-morrow*, he stressed the fact that only by hard work could the industry correct the conditions which were putting its fine safety record in reverse.

Mr. Zook then called on Col. H. A. Reninger, chairman of the Nominating Committee, for his report. Col. Reninger stated that the Nominating Committee felt the officers of the past year had not had the opportunity, because of existing conditions in the industry, to do the work of which they were capable. In view of this fact, the Nominating Committee recommended unanimously that all officers be retained for another year. Upon motion, duly seconded, and unanimously carried, all the officers were declared elected for the year 1934-35. They are: General Chairman, J. B. Zook, Great Lakes Portland Cement Corp., Buffalo, N. Y.; vice-chairman, W. W. Hamilton, Alpha Portland Cement Co., Easton, Pa.; secretary, A. J. R. Curtis, Portland Cement Assn., Chicago, Ill.; news letter editor, Jack Dempster, Canada Cement Co., Ltd., Pt. Colborne, Ont., Can.; engineering committee chairman, Frederick B. Hunt, Nazareth Portland Cement Co., Nazareth, Pa.; membership committee chairman, H. A. Reninger, Lehigh Portland Cement Co., Allentown, Pa.; poster committee chairman, M. P. Greer, Marquette Cement Mfg. Co., Cape Girardeau, Mo.; program committee chairman, D. B. Coleman, Missouri Portland Cement Co., St. Louis, Mo. Members at large include: R. B. Fortuin, Pennsylvania-Dixie Cement Corp., Nazareth, Pa.; E. Posselt, International Cement Corp., New York, N. Y.; C. E. Ralston, Pittsburgh Plate Glass Co., Pittsburgh, Pa.; F. E. Town, Manitowoc Portland Cement Co., Manitowoc, Wis.; H. Vanderwerp, Medusa Portland Cement Co., Cleveland, O.

A paper, *Analysis of Accidents in the Cement Industry*, was presented by A. J. R. Curtis, assistant to the manager, Portland Cement Assn. Mr. Curtis brought out effectively the fact that safety is not a static thing and that the cement industry could not coast along on the splendid record of the past few years. Danger of this attitude is evident in the experience of the first eight months of 1934, which show that all accidents increased 55.5 per cent. over the corresponding period of 1933 with an increase of 42.8 per cent. in fatalities.

M. P. Greer, safety engineer, Marquette Cement Mfg. Co., Cape Girardeau, Mo., announced that he would attempt to cover only one phase of the subject to which he and Mr. Wishman had been assigned, and would limit his discussion to the question, *How to Investigate Our Accidents.*

O. E. Wishman, safety engineer of the Lawrence Portland Cement Co., Thomaston, Me., completed the joint paper, discussing *How to Report and Capitalize Our Accidents.*

W. J. Worthy, superintendent of the Medusa Portland Cement Co., Toledo, O., made a thorough presentation of the subject, *Safetyizing Transportation in Cement Mills and Quarries*, and illustrated his paper with 600 ft. of motion-picture film which he had prepared for this occasion.

At the Thursday morning joint session with the Quarry Section W. P. Rice, superintendent of the Crescent Portland Cement Co., Wampum, Pa., presented a paper covering the subject, *Preventing Falls of Persons in the Cement Industry.*

W. T. Groner, superintendent of the Southwestern Portland Cement Co., Osborn, O., next presented a paper on *Hand-Tool Accidents and Their Prevention.*

Following Mr. Groner's paper, Chairman Zook opened the meeting for a round-table discussion and suggested the question, *What Effect on Employees' Attitude Does the Present Necessary Economy Measures Have, Particularly Relating to Company Loyalty and Safety?*

Other papers read at the joint sessions included: *The Value of Competent First Aid*, by Dr. W. J. Fenton, American National Red Cross, Washington, D. C.; *The Dust Hazards In Industry*, by Dr. R. R. Sayers, U. S. Public Health Service, Washington, D. C.; and *The Foreman's Duties and Responsibilities in Preventing Accidents*, by Glen L. Gardner, National Foreman's Institute, New York, N. Y.

The officers and members of the executive committee selected by the Quarry Section follow: General Chairman, William H. Baker, J. E. Baker Co., York, Pa.; vice-chairman, William E. Hilliard, New Haven Trap Rock Co., New Haven, Conn.; poster committee chairman, H. F. Yotter, General Crushed Stone Co., Easton, Pa.; publicity committee chairman, J. R. Boyd, National Crushed Stone Assn., Washington, D. C.; statistics committee chairman, W. W. Adams, U. S. Bureau of Mines, Washington, D. C. Members at large included: V. P. Ahearn, National Sand and Gravel Assn., Washington, D. C.; Norman G. Hough, The National Lime Assn., Washington, D. C.; O. M. Graves, General Crushed Stone Co., Easton, Pa.; A. L. Worthen, Connecticut Quarries Co., Inc., New Haven, Conn.

Jobs for 173,159 Men on PWA Road Projects

WORK DONE COST $248,484,000

Progress made on the emergency construction of public-works highways to October 27 under the supervision of the U. S. Bureau of Public Roads shows a total of 594 projects, estimated to cost $32,528,000, approved but contracts not yet awarded; 507 projects, estimated to cost $15,258,000, awarded but not yet under construction; 2,776 projects, estimated to cost $179,486,000, under construction; and 6,010 projects completed at a cost of approximately $248,484,000.

The 2,776 projects under construction involve 7,881 mi. of road and are giving regular direct employment to 173,159 men.

Kansas Lone Star Plant Installs New Tube-Mill

★ The Lone Star Cement Co. plant at Bonner Springs, Kan., was shut down for the month of October, making routine repairs and installing a new tube mill on the finish side.

Code Wage Exemption Is Refused Georgia Talc Co.

The application of the Georgia Talc Co., asking an exemption from the wage-rate provisions of Art. IV, Sec. 1, of the talc-and-soapstone industry's code (No. 350), has been denied by Administrative Order No. 350-5. The company sought permission to pay its employees 27½ c. an hr. for underground work and 22½ c. an hr. for overground work, instead of the 30 c. and 25 c. rates required by the code for the southern zone.

Air-Separator Added to New Jersey Pulverizing

★ The New Jersey Pulverizing Co. has installed a second 12-ft. Sturtevant air-separator in its plant at Pinewald, N. J. The first separator of this type was installed late last year with auxiliary elevating and conveying equipment. The good results obtained in the control of particle size led to the decision to duplicate the equipment this year.

Western Illinois Gets New Sand-Gravel Plant

★ A new firm to operate a gravel business has been organized by B. E. Sommers, John Bollen and Charles H. Atwood. Equipment is being installed, including a complete new dragline outfit. The location of the plant is Penny Slough, 8 miles from Geneseo, Ill.

Building Betterments Double Figure for 1933

NINE-MONTH TOTAL $277,878,300

Rehabilitation and improvement of neglected property of all kinds is growing into a national program, according to a statement made Oct. 24 by Thomas S. Holden, vice president of F. W. Dodge Corp. Contracts for alterations and additions to all classes of structures have doubled in volume this year as compared with last year. In the 37 eastern states the amount of such work recorded in the first 9 months of this year was $277,878,300, compared with $139,418,000 for the corresponding period of 1933. A little over half of this year's modernization expenditures were made on privately-owned commercial, industrial and residential buildings. The largest single item in this year's record was $56,213,800 for commercial buildings improvements, a 69 per cent. increase for this class of work over the corresponding period of last year; alterations and improvements for residential structures amounted to $45,977,100, a 36 per cent. increase over last year. These figures do not include small repair jobs, or many jobs resulting from loans made under the new Federal Housing Administration plan.

This year's upward trend in rehabilitation projects is interpreted by F. W. Dodge Corp. as an indication of the timeliness and probable success of the current national modernization program. Although the announced goal of $1,500,000,000 of modernization business by the end of 1935 looks very large, it would actually cover less than 20 per cent. of the country's known requirements for housing repairs of all kinds, without touching the needs for improvements in existing housing for new housing, or for improvements to other classes of property, according to Mr. Holden.

Tennessee Firm Granted Code Wage Exemption

By N.R.A. Administrative Order No. 321-11 the Tennessee Products Corp., Nashville, Tenn., has been exempted from the provisions of Art. IV, Sec. 1-a of the code requiring a minimum wage of 35 c. an hr. in the southern section. However, the company must pay not less than 30 c. and the order may be canceled in the event of a showing of proper cause therefor.

Mississippi Gravel Plant Soon Ready to Operate

★ Work at the plant of the Golden Sand & Gravel Supply Co., three miles north of Golden, Miss., is progressing rapidly. The washing and screening plant is being rebuilt and new and modern equipment is being installed to elevate the sand and gravel to the washer by dredge boat, eliminating the steam shovel, locomotive and conveyor belt formerly used. A pool has been completed in which a new barge will be launched and the pump and necessary machinery will be installed.

Code Provisions Upheld for Overburden Removal

The Industrial Appeals Board of the N.R.A. has affirmed the denial of an application by the Pitts Slate Corp., the Williams Slate Co., the Arvonia-Buckingham Slate Co., and the Le-Sueur-Richmond Slate Corp., all of Virginia, for exemption from the provisions of the slate code.

These firms had appealed from an administrative interpretation of "quarrying" including them in its scope, and from orders denying previously-requested exemptions from the wage provisions of the slate code. The firms had argued that their operations were not within the scope of the code unless they were engaged in both "quarrying" and "selling" slate. This argument was overruled by the board and the administrative order was upheld.

The Pitts Slate Corp. has been enlarging its quarry by removing the overburden, consisting of earth and material which does not contain any slate, and has contended, therefore, that this work is not quarrying slate. It has also contended that it is prospecting to discover a better grade of commercially-producible slate. The slate industry's Code Authority has claimed that these operations are incidental to slate quarrying and that they are commonly carried on by all members of the industry and are considered by them as parts of their quarrying operations.

The following question was therefore presented for interpretation by the N.R.A.:

"Is the Pitts Slate Corp. a member of the slate industry in so far as the incidental work of expanding its quarry is concerned, taking into consideration the fact that it has in the past both quarried and sold slate but at present is only selling what it has quarried in the past?"

According to the N.R.A.'s interpretation, "the term quarrying includes all those operations carried on at the site for the purpose of facilitating or which do facilitate the removal of slate from a vein whose existence may be reasonably inferred from nearby quarries, outcrops of slate, or other available geological data." The interpretation states further that "the operations of the Pitts Slate Corp. are quarrying operations" and the company is a "member of the industry."

This is the interpretation upheld by the Industrial Appeals Board.

★ The Andersen Sand & Gravel Co., 1704 Gratiot Av., Saginaw, Mich., recently installed an Orville Simpson Rotex screen.

Authorize Bids for 5,000,000 Bbl. Cement

REQUIRED OVER 5-YEAR PERIOD

The Metropolitan water district directors in Los Angeles, Cal., recently authorized the advertising for bids on 5,000,000 bbl. of cement to be delivered over the period from July 1, 1935, to June 30, 1940, in addition to awarding contracts totalling $14,126,175 for the construction of conduits, canals and syphons on a 110-mi. stretch of the Colorado River Aqueduct. This huge supply of cement, believed to be the largest single order ever put up for bids, is expected to be sufficient for concrete work on the aqueduct project. Engineers said the cement would suffice for construction of a 14-ft. concrete highway from Los Angeles to New York.

Pennsylvania Producer Makes Plant Additions

★ The Ellwood City Stone Co., Ellwood City, Pa., which has made many important improvements to its plant in recent years, has installed a Wood Auto-Vortex classifier.

140,000 Bbl. Cement Goes to Two Nebraska Plants

Contracts for 140,000 bbl. of cement to be used in the construction of the Sutherland project near North Platte, Neb., have been awarded to the Ash Grove Lime & Portland Cement Co., and the Nebraska Cement Co., each getting 70,000 bbl. In addition the Monarch Cement Co., Humboldt, Kans., received a contract for 6,000 bbl. of a special grade of high-early-strength cement.

Mississippi Cuts Rates on Aggregates for Roads

The Mississippi Railroad Commission closed a two-day hearing on Sept. 7 by shaving off 25 per cent. from the intrastate freight rate on sand and gravel for highway construction in a decision handed down on a protest entered against the railroads of the state by the Central Mississippi Gravel Co. It is estimated the new rate will save the sand-and-gravel shippers of the state approximately $200,000. An application for an injunction was refused the railroads, which plan an appeal to federal courts.

★ The Carbon Limestone Co., Youngstown, O., recently installed a Wood Auto-Vortex classifier in its plant at Hillsville, Pa.

★ The National Portland Cement Co., Brodhead, Pa., is installing a complete Northern Blower Co. dust collecting system in its new cement plant which is nearing completion.

Editorials

The Public's Interest in Industry

AFTER the chaff of most present-day politico-economic discussions is blown away the disputants are usually found to be allied with two lines of thought. One takes the position that the public has a deep and natural interest in the objectives, processes and results of industry; the other holds to the theory that industry is synonymous with business and that business is a matter of private concern in the conduct of which the public does not and should not have a voice. One believes that the goal of industry, and particularly that branch of it devoted to production, in theory is, and in practice should be, the serving of the public; the other believes that, since industry and business are but different names for the same social phenomenon and since profit is the main-spring of business operations, the public exists and should exist merely for the purpose of furthering business aims. The position of the opposing views has been epitomized in the phrases "production for service" and "production for profit," terms which are suggestive even if not wholly accurate.

This line of cleavage in social theory almost coincides with that which divides those groups generally spoken of as forming the contesting parties in the class struggle. The chief difference lies in the fact that the opponents of the absolutist theory of business enterprise are thought of in one case as a public with whom consumer interests are paramount and in the other as a public whose chief interest is in the price paid for its labor. One movement is characterized by a timidity which manifests itself in the utilization of peaceful and conciliatory means of pressing its point of view, while the other is known for its aggressive temper and its greater readiness to resort to warlike measures. It may reasonably be questioned whether the public in its consumer *rôle* is not a more effective opponent of "production for profit" than the public in its *rôle* of laborer, since its pressure for social reform in such matters as consumer protection is applied more directly to the profit rate realizable from business and is strengthened by the rivalry for its trade that exists among competitive enterprises. Its proselytizing work may be subtly done but is likely on that account to be more rather than less effective.

Business has been forced to reckon with both types of public opposition. As every worker is a consumer and as most consumers are workers who sell their labor, there is a natural and unavoidable merging of interests and aims with the result that most members of the public have the two grounds of opposition to the aims of business enterprise, that of the consumer (buyer) and that of the worker (earner). Since the two interests are present in the mental attitudes of the same people, the claims, the logic, the power of each interest becomes confused with and adds strength to those of the other. After the process, which is a mixture of psychic, material and emotional factors, has progressed far enough we observe its culmination in such widespread unanimity of opinion as is manifest in the public's attitude toward the social-reform measures of the "new deal." One may not share these psychic, material and emotional urges, but one can scarcely fail to see the results of their operation in the social and economic life of our time.

In our *rôle* of consumers it is not difficult to conceive many ways in which the absolutist theory of business enterprise runs counter to our interests and desires. When we enter the market as buyers we all seek the maximum degree of serviceability—whether it be expressible in terms of beauty, convenience, durability, speed, efficiency, output, pecuniary display, or the like—and we hope to obtain it at the lowest cost. These aims constitute a direct challenge to the theory of production for profit. The manufacturer naturally seeks to obtain the highest return for his invested capital and his own efforts, and in trying to attain these ends the possibilities of lowering the quality, the durability, the efficiency and the other real-value standards of his product suggest themselves immediately, at the same time that he recognizes the importance of the beauty, pecuniary-display and similar factors as means of concealing its weaknesses and gaining a high price in the market. The general ignorance of buyers, due to the inacessibility of information that would make them well-informed, favors the continually-widening use of the concealing, or deceptive, qualities of commodities and the furtherance of selling methods designed to divert the buyer's attention from factors that are important to him to those factors that are important to the manufacturer.

The public in its *rôle* of worker finds even more ways in which its interests clash with those of business enterprise. When the worker searches for employment he seeks the kind of work most congenial to him—that which is best known to him, most conveniently placed, most regular, least burdensome to him in duration, physical and mental application and nervous strain, least hazardous in exposure to accident and disease, and least susceptible to interruption or termination—and he naturally seeks to obtain the highest price for it. No less naturally the employer tries to operate his plant during the greatest number of hours in each day and with the fewest changes of employees, seeking to work them long hours, to exact from each one the maximum amount of work, to spend as little as possible on the provision of safe and healthful working conditions, to adjust the continuity and other characteristics of employment in accordance with his own convenience or needs, and to pay as little as the

competition between unemployed workers makes necessary. In order to attain these ends he may try to prevent the organization of his workers into protective associations (even by establishing pseudo-employee organizations controlled by him), he may deliberately make employment uncertain, irregular and unpleasant for the purpose of preventing demands for increases in wages, and he may unite with other employers with a view to standardizing their collective attitude toward their present and prospective workers.

In short, as the average man sees it, when he buys commodities he pays dear, when he disposes of his labor he sells cheap, and no one aside from himself and those similarly situated has seemed to be much interested in the fact. Even though this conflict of interests appears to him to be due to the malevolence of employers, it is but the natural and inevitable result of inequalities in bargaining power which have become greater as the technique of business men in the fields of selling and employing has improved.

It is impossible, therefore, that the public should remain indifferent to the nature, or the scope, or the effects of business operation and management. It is likewise impossible that business should continue to expand indefinitely, or even to maintain its present position, and remain indifferent to the claims of the consumer and worker attitudes of the public which supports it. The social and economic adjustments through which we are passing are the results of deliberate action on the part of government, but they are also the tangible expression of an altered public opinion which understands better than ever before, and is prepared to protect better than ever before, its interests in the conduct of industry. Because the public in its dual *rôle* of consumer and worker does, in effect, constitute industry—except, possibly, in its managerial functions —the two can not be treated as separate entities. The failures and discouragements of the last few years have made clear the single identity of these heretofore conflicting interests and have demonstrated the futility of trying to advance either the employer attitude or the consumer-worker (public) attitude at the expense of the other. To maintain a reasonable degree of balance and harmony between them, something more than the indifference, the *laissez faire*, and the neglect of the past will be needed.

In our present state of enlightenment it seems that the answer lies within the field of economics and that the methods may be some kind of economic control organized and directed by those who can represent, perhaps in functional directions, the varied and temporarily-conflicting interests of the many groups that make up our body politic. In the technique of production we have accomplished astounding results; in the field of industrial control it is reasonable to assume that we may be able to do as much. We have demonstrated our ability to produce commodities beyond our capacity to consume them, and we have shown an ability to improve the efficiency of our productive equipment far beyond the standards of present-day performance. Somewhere between the productive and the consumptive sections of society must be placed an organization that will serve efficiently in making our great potential wealth available to satisfy the ever-growing demands of consumers. It is in the field of economic organization that our greatest need, our greatest opportunity, and our greatest responsibility lie.

The T. V. A. Cement Orders

TO whatever motives individual cement makers may be inclined to attribute it, the recent decision of the Tennessee Valley Authority to purchase the cement required for the Norris and Wheeler Dam projects was received with general satisfaction by the cement industry. For a long time the manufacturers had been oppressed by the fear that the T. V. A. would build its own cement plant, although the Authority's cement requirements for those projects do not exceed 6,000,000 barrels and such a venture would have been unwise and undoubtedly uneconomical. The threat to manufacture its own cement had been used by the T. V. A. officials in an attempt to obtain lower price quotations from the interested cement makers and to the extent that it accomplished the desired end it may have been defensible. The fact that the threat was not taken seriously in some quarters did not in any way lessen its effectiveness as a weapon of intimidation, for the bids that have since been accepted are materially lower than the prices expected.

The situation of the cement industry, which is burdened with a production capacity vastly in excess of the present and visible future demand for cement, added weight to the government's threat. While cement manufacturers might look with at least a show of indifference on the possible loss of 6,000,000 barrels of output, they could hardly conceal their fears of a new producing competitor, which, long after the object of its creation might have been fulfilled, would have remained as a constant threat to private manufacture. A realization of this effect was disclosed by the T. V. A.'s chairman, Dr. Arthur E. Morgan, when he said that the Authority was "willing to pay more" to commercial producers than it believed would be the probable cost of manufacture by the government in order to avoid building and operating "an additional plant in an already-overbuilt industry." The result was the awarding of contracts for 800,000 barrels of cement for Norris Dam at a delivered price of $1.7384 per barrel and for 700,000 barrels for Wheeler Dam at a price of $1.8798.

While these prices may not have met the expectations of the cement manufacturers, their acceptance of them appears to have been fully justified. The difference between the prices bid and those thought proper probably represents a comparatively small price to pay for the protection from government competition which now seems assured. The specter of a government-owned cement plant seems to have been laid, at least for a time.

Labor Provisions of N. R. A. Codes Show Numerous Striking Differences

No Uniformity in Wage Rates, Maximum Hours or Schedules for Overtime Pay

A COMPARISON of the labor provisions of the N.R.A. codes now in effect in various nonmetallic-mineral and related industries shows little evidence of concerted effort and no unanimity of opinion as to the proper levels for minimum wages or maximum hours. And what must appear even stranger to distinterested observers is the fact that the National Recovery Administration made no serious, or at least no successful, attempt to require uniform wages or uniform hours for the same or similar work in given sections. Even the North-South wage differential, where one might reasonably look for a tendency toward uniformity, exhibits great discrepancies.

If the Research and Planning Division of the N.R.A. worked on this problem of trying to reconcile the wage and hour provisions of one code with those of another, it must be said that the reconciliation is far from a *fait accompli*. If the Labor Advisory Board had definite aims in mind, these are not manifest in the results. The minimum-wage provisions of nearly every code appear to be in the nature of hit-or-miss compromises, lying somewhere between the extremes of the most that the N.R.A. thought could be obtained and of the least that employers might be willing to concede. It is not to be wondered at that the compromises are almost as numerous as the industries affected.

An explanation for the disparities may be found in a desire on the part of the N.R.A. to give to each industry the maximum amount of self-control and self-determination permissible under the law. Certainly they disclose no attempt to "regiment" even similar industries on these two all-important subjects—the maximum hours and minimum wages of labor.

Wages.—In Table I are summarized the minimum-wages, maximum-hours, overtime-pay, and age-of-minors provisions of the N.R.A. codes of 20 nonmetallic-mineral and related industries. The data given in the minimum-wages column show rates ranging from 30c. to 45c. an hr. for the Northern states and from 24c. to 37½c. for the Southern states.

The differential between rates in the North and those in the South ranges from 2½c. an hr. in the asbestos industry to 15c. in the ready-mixed-concrete industry (Table II), the average being 8.2c. Two industries, the natural-cleft-stone and the slate, recognize no difference between Northern and Southern states, the former paying 40c. and the latter 35c. an hr. in both. In 1 industry (sandstone) the differential is 3c., in 1 industry (roofing-granule) 4½c., in 2 industries (feldspar and rock-wool) 5c., in 3 industries (gypsum, lime and marble) 7½c., in 1 industry (limestone) 8c., in 6 industries (cement; crushed-stone, sand-and-gravel and slag; mica; sand-lime-brick; soft lime-rock; and talc-and-soapstone) 10c., and in 2 industries (fullers' earth and refractories) 11c.

Wages in the North.—In the Northern states the record for the lowest minimum goes to the feldspar industry, which is paying 30c. an hr. for underground work and 35c. for work in milling and grinding operations. This highest minimum, 45c. an hr., is paid by the ready-mixed-concrete industry—a product business that is carried on in large cities and their metropolitan areas—and rises to 50c. in the city of New York. The next highest rate—or what is in reality the highest minimum in the nonmetallic-mineral group—is 40c. and is in effect in the cement; the crushed-stone, sand-and-gravel and slag; the asbestos; the natural-cleft-stone; the rock- and slag-wool; the sand-lime-brick; the soft-lime-rock; and the talc-and-soapstone industries. The refractories industry pays 38c.; the gypsum, the lime, the marble-quarrying, and the roofing-granule industries 37½c. Thirty-five cents is the rate in the fullers' earth, the mica, and the slate industries. Summarizing, it is found that 1 industry pays 30c. an hr., 3 industries pay 35c., 4 pay 37½c., 2 pay 38c., 1 pays 38½c., 7 pay 40c., and 1 pays 45c.

Most of the Northern rates shown in Table II are subject to exceptions, some higher, some lower. Thus, the 40c. rate effective in the cement industry has been reduced to 37c. in St. Louis County, Minn., and Ralls County, Mo. The gypsum industry's rate has been raised to 40c. west of the 108th meridian, in Kansas and Oklahoma, and in cities of 100,000 population and over and their immediate trade areas. The 40c. rate of the natural-cleft-stone industry is cut to 38c. in the northeastern area. In the ready-mixed-concrete industry the 45c. rate has been lowered to 40c. in southern California, Colorado, Delaware, the District of Columbia, Idaho, Maryland, Montana, Nevada, Oregon, Utah and Wyoming and raised to 50c. in the city of New York. In the refractories industry a rate of 35½c. is effective in Missouri (outside St. Louis and St. Louis County) and Ohio (except Cincinnati, Niles and Portsmouth); a rate of 41c. obtains in East Chicago, Ind., and Joliet, Ill.; while in Niles, O., and Pittsburgh, Pa., the rate is 44c. The sand-lime-brick industry has adopted a lower rate of 35c. in California south of Tehachapi, but has included Virginia in the northern 40c. zone. In the sandstone industry Ohio south of the 41st deg. of lati-

Table I.—TABULAR ANALYSIS OF LABOR PROVISIONS IN N. R. A. CODES IN NONMETALLIC-MINERAL AND SOME RELATED INDUSTRIES—Part I

Industry and Effective Date of Code	Minimum Wages	Maximum Hours	Provisions for Overtime Pay	Age of Minors Excluded from Employment
Cement Code No. 128 (Dec. 7, 1933)	30c. an hr. in Ala., Fla., Ga., La., Tenn., Tex., Va. 37c. an hr. in St. Louis County, Minn.; Ralls County, Mo. 38c. an hr. in Jefferson and Meade Counties, Ky. 40c. an hr. elsewhere. (See Notes 1 and 2)	36 hr. a week averaged over one-half calendar year (maximum 42 a week, 8 a day) for general employees. 36 hr. a week averaged over one-half calendar year (maximum 10 a day) for employees in packing and shipping depts. 40 hr. a week for clerical or office employees.	1½ regular rate after 36 hr. a week averaged over one-half calendar year for employees on hourly basis.	Under 16 in general occupations. Under 18 in hazardous occupations.
Crushed-stone, sand-and-gravel and slag. Code No. 109 (Nov. 20, 1933)	25c. an hr. in Ala., Fla., Ga., Miss., So. Car.; 30c. an hr. in other southern states; and 40c. an hr. in North for general employees. $13 a week in South and $14 a week in North for watchmen. $12 to $15 a week, according to population, for office employees.	40 hr. a week for general employees. 48 hr. a week for outside delivery employees and those engaged in emergency repair work. 60 hr. a week for watchmen. 42 hr. a week averaged over 3 months in any 6 months, and a 6-day week for office employees.	1½ regular rate for employees on hourly basis.	Under 16 in general occupations. Under 18 in hazardous or unhealthful occupations.
Gypsum Code No. 420 (May 21, 1934)	40c. an hr. in cities of 100,000 population or over and their immediate trade areas; 40c. an hr. west of 108th longitudinal meridian; 37½c. an hr. east of 108th longitudinal meridian and north of 38th parallel of latitude; and 30c. an hr. in all other parts of the United States except Kansas and Oklahoma, for general employees. $14 to $15 a week, according to population for clerical, office and inside sales and sales-service employees.	40 hr. a week averaged over one-half calendar year (maximum 48 a week) for general employees. 40 hr. a week averaged over 30-day period (maximum 48 a week) for clerical, office, sales and sales-service employees. 48 hr. a week for engineers, firemen and pumpmen. 56 hr. a week for watchmen. Outside sales and sales-service men and employees on emergency repair work not subject to hour limitations. (See Note 3)	1½ regular rate after 8 hr. in any day for general employees on hourly basis. 1½ regular rate after 40 hr. a week or 8 hr. in any day for employees on emergency repair work.	Under 16 in general occupations. Under 18 in mining, quarrying or milling operations.
Lime Code No. 31 (Oct. 13, 1933)	30c. an hr. in South and 37½c. an hr. in North for general employees. $12 to $15 a week, according to population for clerical employees.	40 hr. a week averaged over 6 months, 8 a day.	1½ regular rate after 8 hr.	Under 16.
Asbestos Code No. 80 (Nov. 13, 1933)	32½c. an hr. for females and 37½c. for males in South; and 35c. for females and 40c. for males in North for factory employees. $14 to $15 a week, according to population, for office employees.	40 hr. a week, 8 a day (in peak periods 48 hr. a week during 6 weeks in 6-month period) for factory employees. 40 hr. a week averaged over 6 months (maximum 48 hr. in 1 week) for office employees.	1½ regular rate.	Under 16 in general cupations. Under 18 in hazardous or unsanitary occupations.
Feldspar Code No. 206 (Jan. 29, 1934)	25c. an hr. in South and 30c. an hr. in North for mining operations. 30c. an hr. in South and 35c. an hr. in North for milling and grinding operations. $13.50 a week for office employees.	40 hr. a week averaged over 3 months (maximum 48 in 1 week) for mining operations. 40 hr. a week, 8 a day, 6 days in 7, for milling and grinding operations. 40 hr. a week, 10 in 24, for office employees.	1½ regular rate after 8 hr. in 24 for emergency maintenance or repair work.	Under 16 in general occupations. Under 18 in hazardous or unhealthful occupations.
Fullers' earth producing and marketing Code No. 356 (Mar. 30, 1934)	24 to 35c. an hr., according to geographical area, for general employees. $14 to $15 a week, according to population, for office employees.	40 hr. a week averaged over 6 months (maximum 48 in 1 week), 10 in 24, for general employees. 48 hr. a week for engineers, firemen, electricians and laboratory staff (not to exceed 10 per cent. of plant employees or 4 employees, whichever is greater). 40 hr. a week for office employees.	1½ regular rate after maximum hr. specified for emergency work.	Under 16 in general occupations. Under 18 in hazardous or unhealthful occupations.
Limestone Code No. 113 (Nov. 24, 1933)	38c. an hr. in North, and rate of July 15, 1929 (but not less than 30c. an hr.) in South for general employees. $14 a week for office employees.	40 hr. a week averaged over 3 months (maximum 48 in 1 week), 8 a day (of 24 hr.), 6-day week, for general employees. 2 hr. a day in excess of above figures for firemen and plant engineers. 48 hr. a week, 6-day week, for truckmen, shipping clerks, etc. 64 hr. a week, 12 a day (of 24 hr.) for watchmen. (See Note 4)	No general provision. 1½ regular rate after 8 hr. (in any 24) for truckmen, shipping clerks, etc.	Under 16 in general occupations. Under 18 in hazardous or unhealthful occupations.
Marble quarrying and finishing industry Code No. 421 (May 21, 1934)	30c. an hr. in Ala., Ariz., Ark., Fla., Ga., Ky., La., Miss., N. Mex., No. Car., Okla., So. Car., Tenn., Tex., Va., W. Va., and 37½c. elsewhere for general employees. $14 to $15 a week, according to population, for clerical or office employees.	40 hr. a week averaged over 6 consecutive weeks, 48 a week, 8 in 24, for general employees. 45 hr. a week for truckmen and shipping clerks. 48 hr. a week for firemen and plant engineers. 56 hr. a week for watchmen. 40 hr. a week (or in estimating work 9 hr. a day) for accounting, clerical and office employees. No limitations placed on outside salesmen or estimators or emergency-breakdown workers. 6 days in 7. (See Note 3)	1½ regular rate after 40 hr. a week or 8 a day for general employees. 1½ regular rate after 9 hr. a day for firemen, truckmen and plant engineers.	Under 16 in general occupations. Under 18 in hazardous or unhealthful occupations.
Mica Code No. 306 (Mar. 5, 1934)	25 to 35c. an hr., according to geographical area.	40 hr. a week, 8 in 24 (48 a week during 6 weeks in 6 months) for general employees. 48 hr. a week for emergency maintenance and repair. 48 hr. a week (56 a week during 6 weeks in 6 months) for engineers, firemen, etc. 54 hr. a week for watchmen. 6 days in 7.	No provision.	Under 16 in general occupations. Under 18 in hazardous or unhealthful occupations.
Natural-cleft-stone Code No. 519 (Sept. 11, 1934)	40c. an hr.; in towns of less than 2,500 population 38c. in Northeastern section and 30c. in Southeastern.	40 hr. a week averaged over one-quarter calendar year (maximum 48 a week, 8 hr. in 24, 6 days in 7).	1½ regular rate after 8 hr. a day and 48 a week.	Under 18.

[1]When hourly rate for same class of work was less than 40c. an hr. on July 15, 1929, not less than rate on that date shall be paid and in no case less than 30c an hr.

[2]Untrained labor for not exceeding 3 months and employees who are old or infirm shall not be paid less than 80 per cent. of minimum, but number of such employees shall not exceed 5 per cent. of all employees.

[3]Order approving Code requires "that the Code Authority shall, not later than 90 days after the dates of this order, submit to the Administrator further evidence that the averaging of hours . . . is necessary in this Industry."

[4]Order approving Code says: ". . . the wages and hours established in this Code are approved only because of competitive conditions with the Limestone Industry and such approval shall not constitute a precedent for any other Industry" and "in the event of revision of the labor provisions of the Code . . . for the Limestone Industry the Code Authority for the Sandstone Industry shall submit recommendations in respect to making like revisions of the Sandstone Code."

tude is classed as southern territory and in this section a rate of 35c an hr. is applied.

Southern Wages.—The 20 industries listed do not occupy the same relative positions in the payment

Table I.—TABULAR ANALYSIS OF LABOR PROVISIONS IN N. R. A. CODES IN NONMETALLIC-MINERAL AND SOME RELATED INDUSTRIES—Part II

Industry and Effective Date of Code	Minimum Wages	Maximum Hours	Provisions for Overtime Pay	Age of Minors Excluded from Employment
Ready-mixed-concrete Code No. 311 (Mar. 9, 1934)	25 to 50c. an hr., according to population and geographical area, for general employees. $14 a week, according to geographical area, for watchmen. $13 to $15 a week, according to population, for office employees.	40 hr. a week, 6-day week, for general employees. 44 hr. a week, 6-day week, for truck drivers and dispatchers. 48 hr. a week for emergency workers (not over 5 per cent. of all employees). 60 hr. a week, 6-day week, for watchmen.	1½ regular rate after hours specified.	Under 16 in general occupations. Under 18 in hazardous or unhealthful occupations.
Refractories Code No. 168 and Amend. 1, Apr. 28, 1934 (Dec. 28, 1933 and May 1, 1934)	27½ to 44c. an hr., according to wage district, for common labor. $14 to $15 a week, according to population for office employees.	36 hr. a week averaged over 30 days, 8 in 24, for common labor. 40 hr. a week averaged over 30 days, 8 a day, for general employees. 48 hr. a week averaged over 30 days, for employees in continuous processes, etc. (who are not to exceed 10 per cent. of all employees). 56 hr. a week, 6 days in 7, for watchmen.	No provision.	Under 16 in general occupations. Under 18 underground.
Rock and slag wool manufacturing Code No. 321 (Mar. 19, 1934)	35c. an hr. in southern section and 40c. an hr. in northern section for general employees. $15 a week for office employees.	40 hr. a week (in peak periods 48 a week during 6 weeks in 6 months) 8 in 24, 6 days in 7, for general employees. 44 hr. a week (in peak periods 48 a week during 6 weeks in 6 months), 9 a day, for maintenance and repair employees. 56 hr. a week for watchmen in open plants. 40 hr. a week, 9 (normal 8) a day, for office employees.	1½ regular rate after 8 hr. a day and 40 a week for general maintenance, repair, and emergency work.	Under 16 in general occupations. Under 18 in hazardous or unhealthful occupations.
Roofing granule manufacturing and distributing Code No. 375 (April 9, 1934)	32½c. an hr. in South and 37½c. in North for general employees. $15 a week for office, sales and service employees.	40 hr. a week, 8 in 24 (50 additional in 6 months) for general employees. 48 hr. a week, 9½ a day (if relief worker is not available, 56 a week but not over 192 in 4 weeks) for workers in continuous kiln-drying and kiln-burning processes. 6 days in 7.	1½ regular rate after 8 hr. a day and 40 a week for general and emergency employees. 1½ regular rate for hours in excess of 9½ a day and 48 a week for continuous-process workers.	Under 16 in general occupations. Under 18 in manufacturing and mining operations.
Sand-lime brick Code No. 365 (April 5, 1934)	25 to 40c. an hr., according to geographic area, for general employees. $15 a week for watchmen. $13 to $15 a week, according to geographic area, for office, service and sales employees.	40 hr. a week, 8 in 24, 6 days in 7, for general employees. 15-per cent. tolerance for foremen and ½ hr. a day and 3 hr. a week tolerance for employees closing "hardening cylinders" (not to exceed 2 in each plant). 40 hr. a week, 10 in 24, for employees in plants having not over 2 "production units" and no "excess hardening cylinder capacity." 40 hr. a week averaged over 4 weeks (maximum 48 in 1 week) for employees in plants dependent on favorable weather. 56 hr. a week for watchmen.	1⅓ regular rate after 8 hr. a day and 40 a week for emergency work and employees closing "hardening cylinders." 1⅓ regular rate after 8 hr. a day for employees in plants having not over 2 "production units," etc.	Under 16 in general occupations. Under 18 in hazardous or unhealthful occupations.
Sandstone Code No. 388 (April 16, 1934)	35c. an hr. in Ala., Ariz., Ark., Fla., Ga., Ky., La., Miss., N. Mex., No. Car., Ohio (south of 41st degree of latitude), Okla., So. Car., Tenn., Tex., Va., W. Va. and 38c. elsewhere for general employees. $14 a week for office employees; office boys and girls 80 per cent. of this rate (not exceeding 5 per cent. of all employees).	40 hr. a week averaged over 3 months, (maximum 48 in 1 week), 8 in 24, 6 days in 7, for general employees. 2 hr. a day, 12 in 1 week, in excess of above figures for fireman and plant engineers. 48 hr. a week, 6 days in 7, for emergency-work employees, truckmen, shipping clerks and plant-maintenance crews. 64 hr. a week, 12 in 24, for watchmen. (See Note 4)	1⅓ regular rate after 8 hr. in 24 for truckmen, shipping clerks, plant-maintenance and emergency-repair employees.	Under 16 in general occupations. Under 18 in hazardous or unhealthful occupations.
Slate Code No. 218 (Feb. 1, 1934)	30c. an hr. in Va. and 35c. an hr. elsewhere for general employees. $15 a week for watchmen.	40 hr. a week averaged over 6 months (maximum 45 in 1 week), 9 per day, 6 days in 7, for general employees. 56 hr. a week for slate loaders, shipping clerks, firemen, etc.	1⅕ regular rate after 9 hr. a day and 45 a week for emergency maintenance or repair.	Under 18.
Soft lime rock Code No. 419 (May 17, 1934)	25c. an hr. in Ala., Fla., Ga., Miss., So. Car. 30c. in Ariz., Ark., Ky., La., N. Mex., No. Car., Okla., Tenn., Tex., Va.; and 40c. elsewhere for general employees. $14 to $15 a week, according to geographical area, for office employees.	40 hr. a week averaged over 3 months, 8 a day (maximum 48 in 1 week), 6 days in 7, for general employees. 56 hr. a week for watchmen. 40 hr. a week, 8 a day, 6 days in 7, for office employees. No restrictions on emergency repair workers or outside salesmen. (See Note 3)	1½ regular rate after 8 hr. a day or 40 a week.	Under 16 in general occupations. Under 18 in hazardous or unhealthful occupations.
Talc and soapstone Code No. 350 (Mar. 31, 1934)	25c. an hr. for males and 20c. for females in southern zone, 35c. for males and 28c. for females in northern zone, for work above ground. 30c. an hr. in southern zone and 40c. in northern zone for males and females in work underground. $15 a week for office employees.	40 hr. a week, 8 in 24, for general employees 40 hr. a week (in peak periods 48 a week during 6 weeks in 6 months), 8 in 24, for production employees, etc. 44 hr. a week for preparation and maintenance employees. 48 hr. a week for skilled workers on continuous processes and for hoistmen, powerhouse and pumpmen. 84 hr. in 2 weeks (maximum 56 in 1 week) for watchmen. 40 hr. a week (48 a week during 1 week in 1 month) for office employees. 6 days in 7. Normal 8 hr. a day.	1½ regular rate after 8 hr. a day and 40 a week for production employees, etc., emergency maintenance and repair (except in catastrophies involving loss of life). 1½ regular rate after 40 hr. for skilled workers on continuous processes.	Under 16 in general occupations. Under 18 in work other than office, sales, etc.

[1]When hourly rate for same class of work was less than 40c. an hr. on July 15, 1929, not less than rate on that date shall be paid and in no case less than 30c an hr.

[2]Untrained labor for not exceeding 3 months and employees who are old or infirm shall not be paid less than 80 per cent. of minimum, but number of such employees shall not exceed 5 per cent. of all employees.

[3]Order approving Code requires "that the Code Authority shall, not later than 90 days after date of this order, submit to the Administrator further evidence that the averaging of hours . . . is necessary in this Industry."

[4]Order approving Code says: " . . . the wages and hours established in this Code are approved only because of competitive conditions with the Limestone Industry and such approval shall not constitute a precedent for any other Industry" and "in the event of revision of the labor provisions of the Code . . . for the Limestone Industry, the Code Authority for the Sandstone Industry shall submit recommendations in respect to making like revisions of the Sandstone Code."

of wages in the South and North. In the South the fullers' earth industry stands at the bottom with a 24c.-an-hr. rate and the natural-cleft-stone industry at the top with a rate of 40c. Thirty-seven and one-half cents is paid by the asbestos industry; 35c. by the rock- and slag-wool, the sandstone, and the slate industries. The 30c. rate is in effect in the cement; the crushed-stone, sand-and-gravel and slag; the gypsum; the lime; the limestone; the marble; the ready-mixed-concrete; the sand-lime-brick; the soft-lime-rock; and the talc-and-soapstone industries. In brief, 1 industry pays 40c.; 1 pays 37½c.; 3 industries pay 35c., 1 pays 32½c., 10 pay 30c., 1 pays 27½c., 2 pay 25c., and 1 pays 24c.

In some of the Southern states the rates are even lower than those shown in Table II as generally applicable throughout the South. Thus, the crushed-stone, sand-and-gravel and slag industry has a rate of 25c. instead of 30c. in Alabama, Florida, Georgia, Mississippi and South Carolina. Producers in some of these states had been paying as little as 5c. and 10c. an hr. to Negro workers before the adoption of the code.

The natural-cleft-stone industry, which pays 40c. an hr. generally throughout the South, reduces this to 30c. in the southeastern section.

Table II.—COMPARISON OF MINIMUM-WAGE RATES PRESCRIBED FOR LABOR IN THE NORTH AND THE SOUTH BY CODES OF NONMETALLIC-MINERAL INDUSTRIES *(cents per hr.)*

Industry	North[1]	South[2]	Differential
Cement	40c.[3]	30c.[4]	10c.
Crushed-stone, sand-and-gravel and slag	40c.	30c.[5]	10c.
Gypsum	37½c.[6]	30c.[7]	7½c.
Lime	37½c.	30c.	7½c.
Asbestos	40c.[8]	37½c.[8]	2½c.
Feldspar	30c.[9]	25c.[9]	5c.
Fullers' earth	35c.	24c.[10]	11c.
Limestone	38c.	30c.[11]	8c.
Marble quarrying	37½c.	30c.	7½c.
Mica	35c.	25c.	10c.
Natural-cleft-stone	40c.	40c.	
Ready-mixed-concrete	45c.[12]	30c.[13]	15c.
Refractories[14]	38½c.[13]	27½c.[16]	11c.
Rock- and slag-wool manufacturing	40c.	35c.	5c.
Roofing-granule manufacturing and distributing	37½c.	32½c.	4½c.
Sand-lime-brick	40c.[17]	30c.[18]	10c.
Sandstone	38c.[19]	35c.	3c.
Slate	35c.	35c.[20]	
Soft lime-rock	40c.	30c.[21]	10c.
Talc and soapstone	40c.[22]	30c.[22]	10c.

[1] Consists of Cal., Colo., Conn., Dela., D. C., Idaho, Ill., Ind., Ia., Kan., Me., Md., Mass., Mich., Minn., Mo., Mont., Neb., Nev., N. H., N. J., N. Y., N. D., Ohio, Ore., Pa., R. I., S. D., Utah, Vt., Wash., Wis. and Wyo.

[2] Consists of Ala., Ariz., Ark., Fla., Ga., Ky., La., Miss., N. M., N. C., Okla., S. C., Tenn., Tex., Va. and W. Va.

[3] Includes Ark., Ky., Okla. and W. Va. Exceptions: 37c. in St. Louis County, Minn., and Ralls County, Mo.

[4] Exceptions: 40c. in Ark., Ky., Okla. and W. Va.; 37c. in Jefferson and Meade Counties, Ky.

[5] Exceptions: 25c. in Ala., Fla., Ga., Miss. and S. C.

[6] North of 38th parallel of latitude and east of 108th longitudinal meridian; 40c. west of 108th meridian and in cities of 100,000 population and over and their immediate trade areas and in Kan. and Okla.

[7] South of 38th parallel of latitude and east of 108th longitudinal meridian, except Kan. and Okla.; 37½c. in Kan. and Okla.; 40c. in all cities of 100,000 population and over and their immediate trade areas.

[8] Female workers 5c. less.

[9] For mining operations; milling and grinding operations 5c. higher.

[10] Exceptions: 30c. in Ark., Ky., La., N. C., Okla., Tex. and Va.

[11] Or rate of July 15, 1929, if higher.

[12] Exceptions: 40c. in Cal. (southern division), Colo., Dela., D. C., Ida., Md., Mont., Nev., Ore., Utah and Wyo.; 50c. in city of New York.

[13] Exceptions: 35c. in Ariz., Ky., N. M., Tex., Va. and W. Va.; 40c. in Okla.

[14] The rates given are those of Amendent No. 1 (May 1, 1934) and are 10 per cent. above the code rates.

[15] Exceptions: 35½c. in Mo. (outside St. Louis and St. Louis County wherein the rate is 38½c.) and Ohio (except Cincinnati, Niles and Portsmouth wherein the rate is 38½c.); 41c. in East Chicago, Ind., and Joliet, Ill.; 44c. in Niles, Ohio, and Pittsburgh and Salina, Pa.

[16] Exceptions: 35½c. in Ky. (except Ashland and Louisville wherein the rate rate is 38½c.) and W. Va.; 38½c. in Ariz., N. M., Okla. and Va.

[17] Includes W. Va. Exception: 35c. in Cal. south of an east-and-west line drawn through Tehachapi.

[18] Exceptions: 25c. in Ala., Fla., Ga., La., Miss., S. C. and Tex.; 40c. in W. Va.

[19] Exception: 35c. in Ohio (south of 41st deg. of latitude).

[20] Exception: 30c. in Va.

[21] Exceptions: 25c. in Ala., Fla., Ga., Miss. and S. C.

[22] For work underground; work above ground 5c. less.

The sand-lime-brick industry, which pays a minimum of 30c. an hr. in most southern states, pays only 25c. in Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina and Texas.

In Virginia the slate industry's 35c. rate is cut to 30c., and in Alabama, Florida, Georgia, Mississippi and South Carolina the soft-lime-rock industry's rate is only 25c. instead of 30c.

A few industries have some Southern rates that are higher than their prevailing Southern rates. Thus, the cement industry's rate, normally 30c. in the South, is 37c. in Jefferson and Meade Counties, Ky., and 40c. in Arkansas, Kentucky, Oklahoma and West Virginia. In the gypsum industry the rate is 40c. in all cities of 100,000 or more persons and in their immediate trade areas. The fullers' earth industry rate in Arkansas, Kentucky, Louisiana, North Carolina, Oklahoma, Texas and Virginia is 30c. instead of 24c. In the ready-mixed-concrete industry the 30c. rate is raised to 35c. in Arizona, Kentucky, New Mexico, Texas, Virginia and West Virginia, and to 40c. in Oklahoma. The refractories industry rate is 35½c. in Kentucky (except Ashland and Louisville, where it is 38½c.) and West Virginia, and 38½c. in Arizona, New Mexico, Oklahoma and Virginia.

Other Differences.—One industry, asbestos, pays its female workers 5c. an hr. less than its male workers in all states, North and South.

Two industries have adopted different rates for work above ground and work below ground. The feldspar industry pays 5c. an hr. more for milling and grinding operations than for mining operations, doubtless on the theory of a difference in the skill required of the workers. The talc-and-soapstone industry, on the other hand, believing perhaps that underground work is more hazardous than that above ground, takes the opposite attitude and pays a 5c. premium for the former.

Similarity of Work.—Not much greater uniformity of rates is shown when one compares industries having the same or similar operations. The following groupings by type of operations show some strange differences:

QUARRYING AND OPEN-PIT WORK

Industry	North	South
Cement	40c.	30c.
Crushed-stone, sand-and-gravel and slag	40c.	30c.
Lime	37½c.	30c.
Asbestos	40c.	37½c.
Feldspar	30c.	25c.
Mica	35c.	25c.
Natural-cleft-stone	40c.	40c.
Refractories	38½c.	27½c.
Soft-lime-rock	40c.	30c.

DIMENSION-STONE QUARRYING

Industry	North	South
Limestone	38c.	30c.
Marble	37½c.	30c.
Roofing-granule	37½c.	32½c.
Sandstone	38c.	35c.
Slate	35c.	35c.

MINING AND DIGGING

Industry	North	South
Gypsum	37½c.	30c.
Feldspar	30c.	25c.
Talc-and-soapstone	40c.	30c.

Table III.—COMPARISON OF N.R.A. CODES' MAXIMUM-HOURS PROVISIONS FOR DIFFERENT CLASSES OF EMPLOYMENT IN DIFFERENT INDUSTRIES

Industry	Class of Employment									Overtime	
	A General	B Clerical and Office	C Delivery (outside)	D Emergency Repair and Maintenance	E Engineers, Firemen, Pumpmen	F Packing and Shipping	G Sales and Service	H Watchmen	I Other Exceptions	Rate	Begins After
Cement	36[1]	40	(3)	(3)	(3)	36[2]	(3)	(3)		1 1/2	35 hr.[44]
Crushed stone	40	42[4]	48	48	(3)	(3)	(3)	60		1 1/2	([45])
Sand-and-gravel											
Gypsum	40[5]	40[6]	(7)	(7)	48	(3)	40[6]	56		1 1/2	([46])
Lime	40[8]	(3)	(3)	(3)	(3)	(3)	(3)	(3)		1 1/2	8 hr.
Asbestos	40[9]	40[10]	(9)	(7)	(9)	(9)	(7)	(9)		1 1/2	40 hr.[47]
Feldspar	40[11]	40[12]	(3)	(7)	(3)	(3)	(3)	(3)		1 1/2	8 hr.[48]
Fullers' earth	40[13]	40	(3)	(7)	48[14]	(3)	(3)	(3)		1 1/2	40 hr.[48]
Limestone	40[15]	(3)	48[16]	48[16]	([17])	48[16]	(3)	64		1 1/2	48 hr.[49]
Marble	40[18]	40[19]	45	(7)	48	45	(3)	56		1 1/2	40 hr.[50]
Mica	40[20]	(3)	(3)	48	48[21]	(3)	(3)	54		(3)	(3)
Natural-cleft-stone	40[15]	(3)	(3)	(7)	(3)	(3)	(7)	56[22]		1 1/2	48 hr.
Ready-mixed-concrete	40[22]	(3)	44[22]	48[23]	(3)	(3)	(3)	60[22]		1 1/2	([45])
Refractories[24]	36[25]	(3)	(3)	(3)	(3)	(3)	(3)	(3)	48[25]	(3)	(3)
Rock-and-slag-wool	40[26]	40[29]	44[27]	44[27]	44[27]	(3)	(3)	56[28]		1 1/2	40 hr.[51]
Roofing-granule	40[30]	(3)	(3)	(7)	(3)	(3)	(3)	56[32]	48[31]	1 1/2	40 hr.[52]
Sand-lime-brick	40[33]	(3)	(3)	(7)	(3)	(3)	(3)	56	43[34]	1 1/2	40 hr.[53]
Sandstone	40[35]	(3)	(3)	(3)	([36])	(3)	(3)	64[37]		1 1/2	([54])
Slate	40[38]	(3)	56	(7)	(3)	56	(3)	(3)		1 1/2	45 hr.[55]
Soft-lime-rock	40[39]	40[40]	(3)	(7)	(3)	(3)	(3)	56		1 1/2	40 hr.[40]
Talc-and-soapstone	40[41]	40[42]	(3)	(3)	(3)	(3)	(3)	56[43]		1 1/2	40 hr.[46]

[1] 18-month average; maximum 42 hr., 8 a day. [2] 18-month average; maximum 10 a day. [3] Not specially provided for. [4] Averaged over 3 months in 6; 6 days a week. [5] 6-month average; maximum 48 hr. [6] 30-day average; maximum 48 hr. [7] No hour limitations. [8] 6-month average, 8 a day. [9] "Factory employees, mechanical workers, artisans"; maximum 48 for 6 weeks in any 6 months but average not over 40; maximum 8 hr. a day except to meet seasonal requirements or emergencies. Tolerance of 10 per cent. additional hours for maintenance men, watchmen, firemen, engineers, shippers and delivery employees. [10] 6-month average; maximum 48 in any week. [11] 3-month average; maximum 48 in any week, for mining operations; 40 hr. in any week, 8 hr. in any day, 6 days in 7 for milling or grinding operations. [12] Maximum 10 hr. in any 24. [13] Calendar half-year average; maximum 48 hr., 10 in 24. [14] Applicable also to electricians and laboratory staff; maximum 4 employees or 10 per cent. of all, whichever is greater. [15] 3-month average; maximum 48 hr., 8 in 24, 6 days in 7. [16] Maximum 6 days in 7. [17] Firemen and plant engineers 2 hr. a week in excess of "general" maximum. [18] 6-week average; maximum 48 hr., 8 in 24. [19] 8 hr. a day, except when estimating, then 9 hr. [20] Or 8 hr. in 24; maximum 48 hr. in one week in 6 months; 6 days in 7. [21] Maximum 56 hr. in any 6 weeks in 6 months, 6 days in 7. [22] Or 6 days in 7. [23] Not exceeding 5 per cent. of all employees. [24] Rates given are those of Amendment No. 1, effective May 1, 1934. [25] 30-day average; maximum 40-hr. average in 30 days, 8 hr. in 24. For employees who must be present before or after hours, those engaged in continuous processes, and those in work where limitations "may operate unfairly against the employee or may limit production" (not more than 10 per cent. of total employees) a maximum 30-day average of 48 hr. Open-pit mines or quarries may work more than 8 hr. in 24 to take care of unemployment in inclement weather. [26] Or 8 hr. in 24, 6 days in 7; except "peak" periods when maximum is 48 hr. in any 6 weeks in any 6 months. [27] 9 hr. in 24; maximum 48 hr. in any 6 weeks in any 6 months. [28] No limitation on watchmen in closed plants. [29] 9 hr. in 24. [30] 8 hr. in 24, 6 days in 7; 50 hr. overtime allowed in any calendar half-year. [31] Or 9½ hr. in 24; for kiln-drying and kiln-burning processes; when no relief worker available 8 hr. additional in week; maximum 192 hr. in any 4 weeks. [32] No limitations on custodians at plants not operating. [33] Or 8 hr. in 24, 6 days in 7. Maximum on account of time lost through inclement weather 48 hr. or 40 hr. averaged over 4 weeks. Foremen may work 15 per cent. more hours than 8 a day or 40 a week. [34] Employees necessary for closing "hardening cylinders," limited to 2 in each plant, allowed ½ hr. more than 8 hr. daily or 3 hr. more than 40 a week. Employees in plants having not more than two "production units" and no "excess hardening-cylinder capacity" limited to 40 hr. a week, 10 in any 24 beginning at midnight. [35] 3-month average; maximum 48 hr. or 6 days in one week, 8 hr. in 24. [36] Plant engineers and firemen 2 hr. a day or 12 hr. a week in excess of "general" maximum (A). [37] Or 12 hr. in 24. [38] 6-month average; maximum 45 hr. in any week, 9 hr. in 24, 6 days in 7. [39] Or 8 a day averaged over any 3 months; maximum 48 hr. in any week; 6 days in 7. [40] Or 8 a day, 6 days in 7. [41] Maximum 48 hr. a week, 8 hr. a day, for 6 weeks in any 6 months. [42] Maximum 48 hr. in any one week in any one month. [43] Or 84 hr. in 2 weeks; in either case 6 days in 7. [44] Averaged over one-half calendar year for employees on hourly basis. [45] After maximum hours stated, for employees on hourly basis. [46] After 8 hr. a day for general employees on hourly basis (A) and after 40 hr. a week or 8 a day for emergency repair work (D). [47] For employees in C, E, F and H; 48 hr. for those in D. [48] For employees in D. [49] For employees in C, D and F. [50] For general employees (A); after 9 hr. a day for those in D. [51] Or 8 hr. a day for employees in C, D and E. [52] Or 8 hr. a day for employees in D; after hours stated in note 31 for employees in I. [53] Or 8 hr. a day for employees in D and I; after 8 hr. a day for employees listed in last sentence of Note 34. [54] After maximum hours stated for employees in C, D and F. [55] Or 9 hr. a day for employees in D.

MILLING, GRINDING, MANUFACTURING

Industry	North	South
Cement	40c.	30c.
Gypsum	37½c.	30c.
Lime	37½c.	30c.
Asbestos	40c.	37½c.
Ready-mixed-concrete	45c.	30c.
Refractories	38½c.	27½c.
Rock- and slag-wool	40c.	35c.
Roofing-granule	37½c.	32½c.
Sand-lime-brick	40c.	30c.
Talc-and-soapstone	35c.	25c.

Maximum-Hour Provisions.—The terms of the President's Reëmployment Agreement of 1933 provided the starting points for maximum-hours provisions by establishing the 40-hr. week for clerical, office, sales and service employees and the 35-hr.-week, with one maximum week of 40 hr. in any 6 weeks and a maximum day of 8 hr., for every "factory or mechanical worker or artisan." As a result most of the codes herein considered provide the 40-hr. week for office and clerical workers, but show for other workers a tendency in some cases to allow weeks longer than the 35 hr. specified in the reemployment agreement and a more general tendency to allow an averaging of hours (11 codes of the 20 considered). This is the tendency which the N.R.A. has recently been opposing and in later codes has refused to sanction. It is considered likely that existing codes which contain average-hours provisions will be revised, this action having been foreshadowed in some of these codes by the imposition of what are, in effect, trial periods. In several cases (the gypsum, marble-quarrying, natural-cleft-stone, and soft-lime-rock industries) the orders approving the codes contain the following provisions ". . . and provided further, that the Code Authority shall, not later than 90 days after the date of this order, submit to the Administrator further evidence that the averaging of hours as provided . . . is necessary in this industry."

The cement industry, with its provision of a 36-hr. week averaged over 18 months and a maximum of 42 hr., and the refractories industry, with its provision for a 36-hr. week averaged over 30 days and a maximum of 40 hr. averaged over the same period, afford the examples of closest approach to the maxima set up by the reëmployment agreement. The other 18 industries shown in Table III have either straight maxima of 40 hr. or averaged weeks of 40 hr. with 48-hr. maxima.

Emergency Repair Work.—These hour provisions are general and in all industries, except the lime, are subject to exceptions. Some workers, notably employees engaged in emergency maintenance and repair work, are not subject to hour restrictions in the gypsum, asbestos, feldspar, fullers' earth, marble, natural-cleft-stone, roofing-granule, sand-lime-brick, slate, and soft-lime-rock

(Continued on page 38)

Success of Recent Blast Shows the Value of Analyzing Experience Data

Study of Conditions Provides Basis for Determining Blast-Hole Loading

A BLAST made July 31, 1934, in a central Ohio crushed-stone quarry should be of interest to other producers operating in similar deposits because of the unusually good results obtained. As in most other quarries in this section, the stone in the deposit referred to is highly stratified and breaks up in distinct layers, ranging in thickness from 3 in. at the surface of the deposit to about 5 ft. at the level of the floor of the quarry, which has a 25-ft. face. There are also vertical faults which complicate the drilling and blasting problem. The stone is a hard blue limestone having an abrasion test of from 15 to 18, and it weighs 165 lb. per cu.ft. There are, however, no clay seams or pockets, and no difficulty is encountered in keeping a smooth quarry floor because of the natural break at the present level.

In spite of the difficult conditions just described, the company has averaged over 4.5 tons of stone per lb. of dynamite for the past several years. All the overburden is removed, and the drilling is done with a Sanderson Cyclone electrically-driven well-drill using 5⅝-in. steel. An average of 60 ft. of hole is drilled in an 8-hr. day.

The shot about to be described consisted of 60 holes averaging 24.5 ft. in depth and arranged in two staggered rows with holes 12.35 ft. apart from center to center. The back-line holes were 31 ft. from both the top and the bottom of the face, and the burden averaged 15.5 ft. Weather conditions were good, but there was from 1 ft. to 6 ft. of ground water in each hole. The loading of the holes was done under the direction of the plant superintendent and the local representative of the Atlas Powder Co. The dynamite required for each hole was decided by inspection, an average of 80 lb. being used, although individual loadings varied as much as 7 lb. above or below that amount depending on conditions.

The sticks of explosive were lowered into the holes by a hook attached to a rope. In the front holes the entire charge of Apex No. 1 was put in first and then tamped with about 13 ft. of screenings. In the back holes 5 sticks (62½ lb.) of Apex No. 1 were first loaded. From 10 to 11 ft. of screenings was then tamped on the top of this charge and was followed by a top charge of 10 to 12 lb. of 40-per cent. gelatin, above which was placed about 7 ft. more of screenings. Breaking up the charge in the back holes was decided upon to help relieve the heavy burden and throw the top over so as to allow the heavy strata of stone at the bottom of the face to break out.

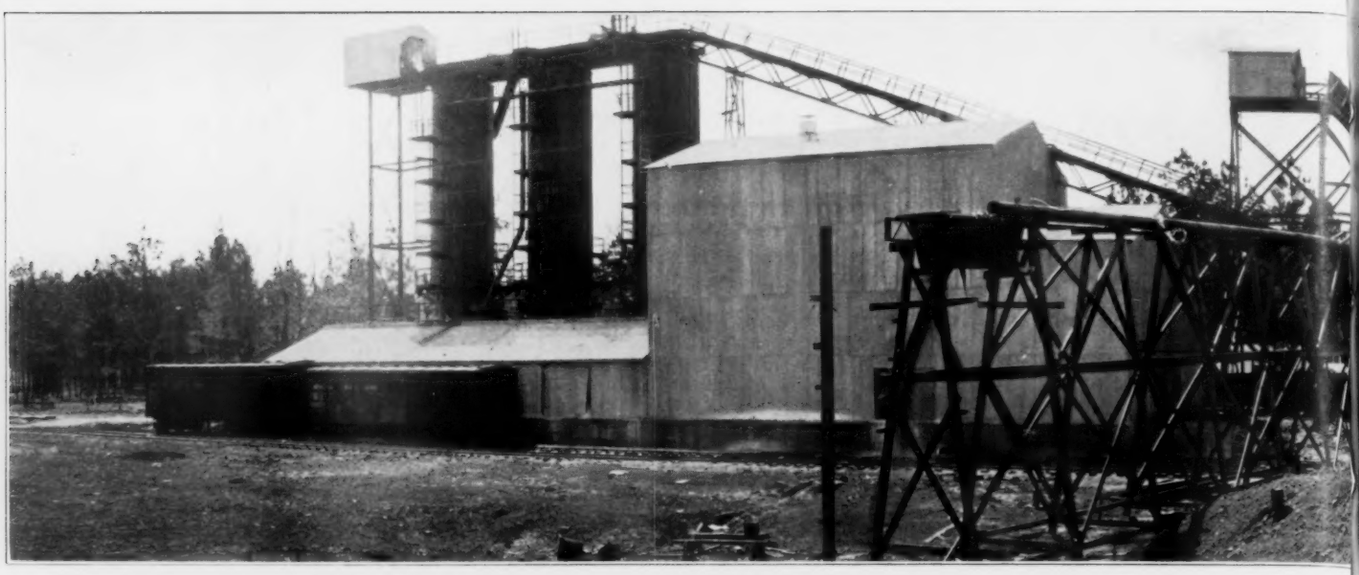
Atlas No. 6 electric blasting caps with 16- and 30-ft. wire were used. Two caps were placed in each bottom charge and one in each of the top loads, the use of multiple caps insuring against "missed" holes. The leading wire used consisted of 500 ft. of No. 10 bare wire, 200 ft. of No. 10 insulated wire and 700 ft. of No. 2 shovel cable. Current was obtained from a 440-v. power circuit. The charges were connected parallel in series with all connections raised off the ground. The loading was started at 9:45 a.m. and finished at 2 p.m. An hour later the blast was detonated.

As it was estimated that the blast moved 23,121 tons of stone, the operation was considered satisfactory from every point of view. A total of 4,300 lb. of Atlas Apex No. 1 dynamite in 4½-in. by 16-in. sticks and 500 lb. of Atlas Giant 40-per cent. gelatin in 1¾-in. by 8-in. sticks was used. It was estimated that only 25 to 30 stones were too large for the plant primary crusher which will take pieces

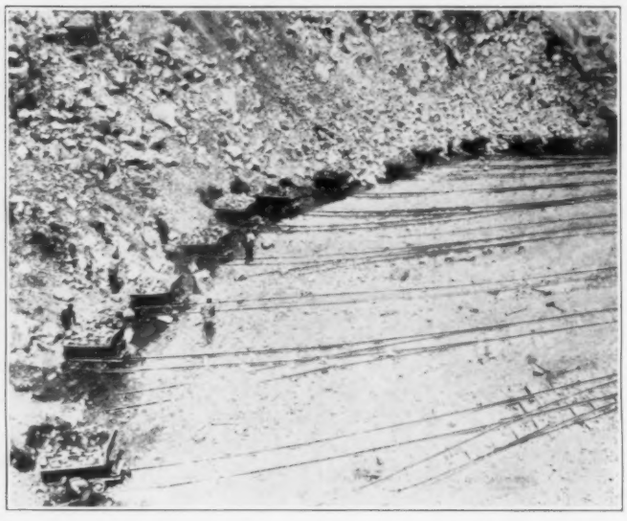
(Continued on page 35)

Uniform results of blast are evident in this view. Stone and asphalt-mixing plants in background.

Another view of blast results with locomotive and cars in foreground and shovel at right.



The modern new lime-and-crushed-stone plant of the Louisiana Lime Products Corp. at Easton, La. The three gas-fired shaft kilns wit building. In the center are the rotary scrubber and scalper with stone-hoist-house and scale-house. At right are the stone screenin



Loading by hand into cars on tracks in the quarry. Note bowlders and slope of face due to hydraulic stripping.

Plant from top of quarry face with crushed-stone building at left and lime kilns in right background.

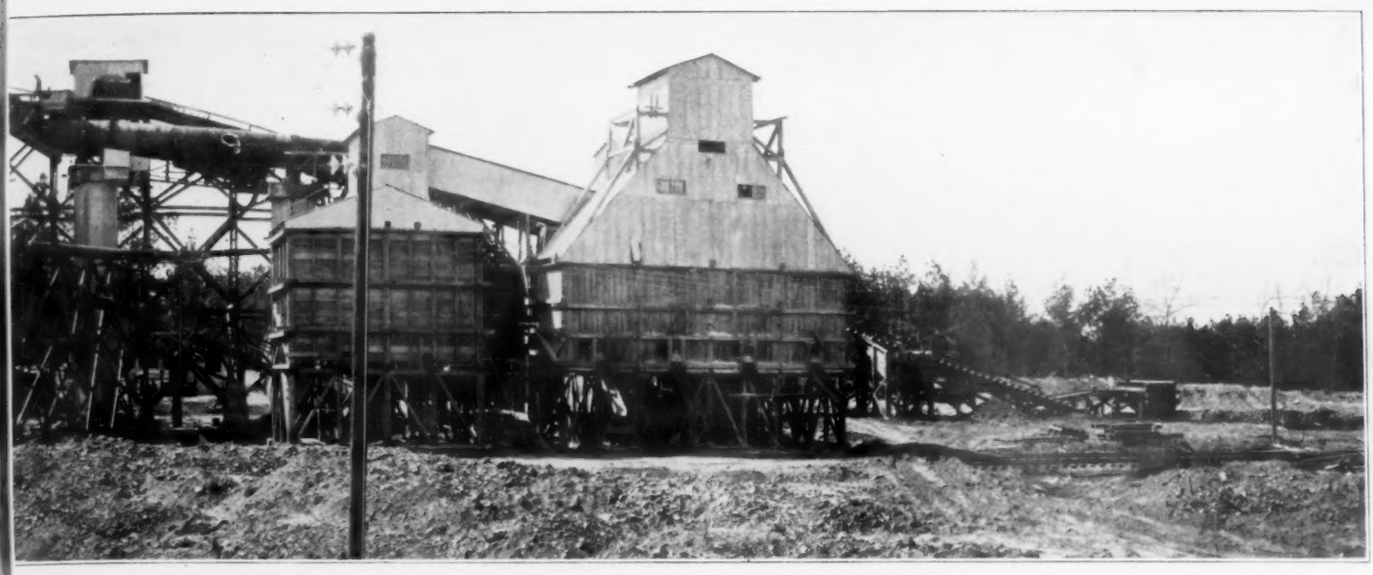
Efficient Vertical- in Louisiana's

Commercial-Ston on as Collatera

By W. H

ONE of the most important recent plant developments in the commercial lime industry is the new operation of the Louisiana Lime Products Corp., at Easton, about 40 mi. south of Alexandria, La. This plant, which went into full operation January 19, 1934, is not only the newest but also one of the largest commercial lime plants in the South and embodies some of the latest developments in vertical-kiln design and operation. It has a lump-lime capacity of 100 tons daily and a hydrating capacity of 30 tons. Incidental to the lime production 300 tons of crushed stone and 60 tons of agricultural limestone can also be produced.

Clearing of the plant site and railroad right-of-way was started in December, 1932. Construction of the crushed-stone plant was begun in February, 1933, and of the lime plant in September of that year. The three vertical lime kilns and the entire lime-hydrating plant were designed by Victor J. Azbe, former consulting engineer for the company, who also assisted in supervising construction. The entire hydrating plant was furnished by the Blaw-Knox Co. A. A. Johnson, plant superintendent, was the engineer in charge of construction for the company. Since the completion of the shaft kilns their chambers have been redesigned and rebuilt and a number of minor changes have been made in other parts of the operation to meet local conditions. The kiln and hydrating buildings are



their incline and hoist-house are at extreme left with several cars being loaded with lump lime. Just to the right is the hydrator crushing and storage buildings with quarry at extreme right. Waste-water flume from washer to settling pond is in center foreground.

Kiln Control Used New Lime Plant

Business Carried to Lime Production

TRAUFFER

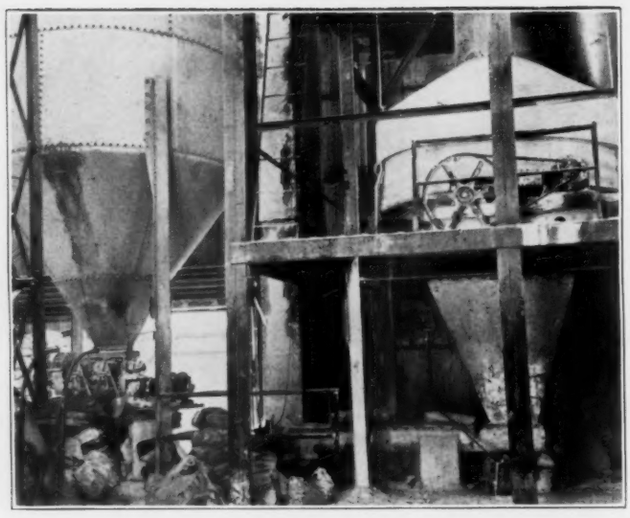
entirely permanent, fireproof steel-and-concrete construction. The other buildings are of timber-and-concrete construction. All buildings have corrugated sheet-metal roofing and siding.

The deposit under lease consists of 360 acres on which the existence of over 10,000,000 tons of suitable stone has been proved. Test holes have been drilled to a depth of 188 ft. without penetrating the limestone, which was found to be of even better quality at greater depths. Near the surface it is a somewhat broken formation with boulders separated by clay and sand seams. The deposit is said to be an uplift of cap rock similar to the one at Winnfield, La. Salt is known to be present at a depth of 520 ft. but no efforts have as yet been made to mine this.

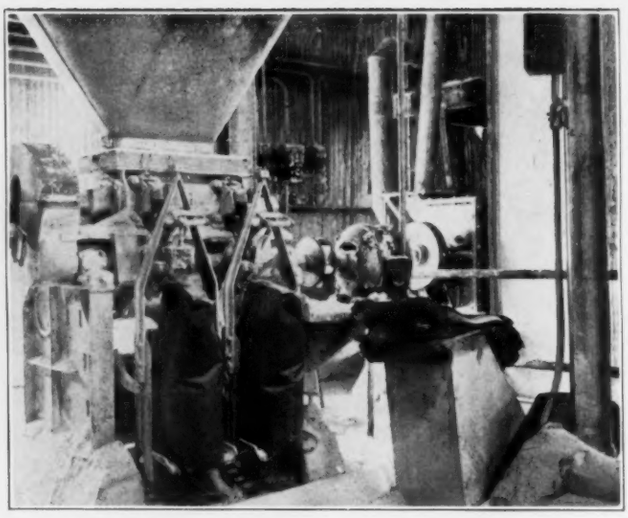
The overburden consists of a sandy clay varying from 2 to 16 ft. in depth. Formerly this was removed with a drag-line but this method was not satisfactory due to the broken condition of the formation. Overburden is now removed at night by hydraulicking. Two 3-in. waterlines with Georgia Iron Works nozzles wash down the overburden and clean out between the rocks as well as washing down some of the loose rock. Gardner-Denver and Chicago Pneumatic jack-hammers are used for the infrequent wall shots made. Rocks larger than man-size are broken down by mud-capping, using Du Pont 30-per cent. nitro-glycerin dynamite.

Quarry and car on incline to plant. Rotary scrubber in foreground and crushed-stone building at right.

Looking down incline from top of kilns. Scrubber at left and stone-screening building at right.



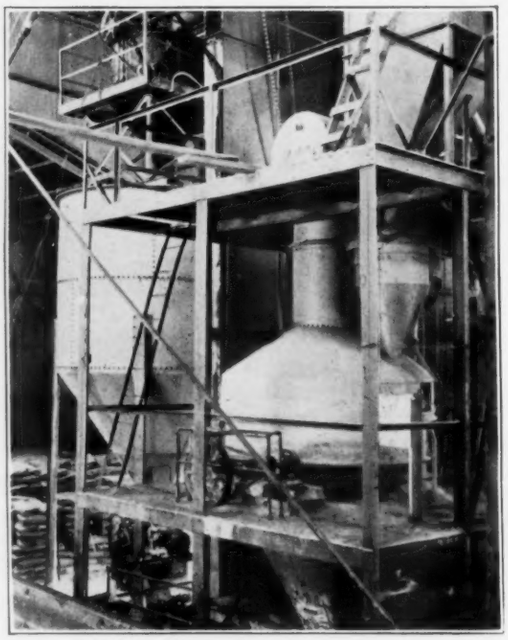
The ½-ton batch hydrator at right with screw-conveyor below feeding elevator to separator. Bag-packer at left.



The 2-bag packer with bin above. Hammer-mill at right crushes rejects from separator and feeds elevator.

According to Supt. A. A. Johnson, the use of the hydraulicking method here has lowered quarrying costs and increased the quarry capacity with the same equipment. Powder costs have also been reduced and safety has been increased because of the sloping walls created by hydraulicking. The silt and water drain into a quarry sump from which a 6-in. Georgia Iron Works sand pump transfers them to a 40-acre settling-pond that forms the plant wash-water supply.

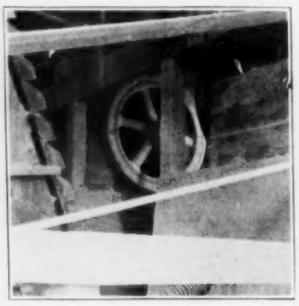
Stone is loaded by hand into 13 Koppel 3-cu.yd. side-dump cars placed on 21 separate tracks radiating from the foot of a single incline. A cable attached to a Novo single-drum hoist draws these cars from the quarry floor, which is at present 65 ft. below ground-level, to the top of the incline which is 60 ft. above ground-level. The cars are weighed on a Howe beam scale and their contents are then dumped by hand into an Allis-Chalmers 6-ft. by 40-ft. rotary washer. This is fitted with baffles and has ⅛-in. perforations in its shell to let out silt, sand and excess water. The last 6-ft. section of the shell has 4-in. perforations which separate the spalls from the kiln stone.



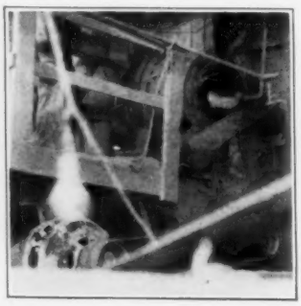
Another view showing hydrator and batcher, screw conveyor and elevator to separator, at upper left, and packer and feed bin below.

The kiln stone, ranging from 4 in. up to 10 or 12 in. in size, is discharged into a 150-ton storage-bin. The spalls, minus 4 in. in size, drop into a 200-ton bin from which an arc gate feeds them through a split chute into a pair of Webb City Iron Works jaw crushers. These reduce them to 2½-in. minus and discharge them into the buckets of an Allis-Chalmers elevator feeding a 4-ft. by 6-ft. triple-deck vibrating screen of the same make. This is equipped with wire cloth having 1-, ½- and ¼-in. openings. The three sizes of coarse aggregate produced are chuted to separate stock-piles

Gyratory primary crusher for lump lime.



The two jaw crushers in the stone plant.



The rotary stone drier with pulverizer below.

The lime pulverizer with elevator at right.

from which they are taken for shipment by a Mead-Morrison gasoline crawler crane.

The minus ¼-in. material from the screen goes to two 40-ton bins. These feed it to a 3-ft. by 10-ft. gas-fired rotary drier which discharges it into a No. 2 Allis-Chalmers hammer-mill. A bucket-elevator and a belt-conveyor operated in series feed it to a 4-ft. by 6-ft. Tyler Hum-mer 2-deck screen which usually produces chicken grit and agricultural limestone.

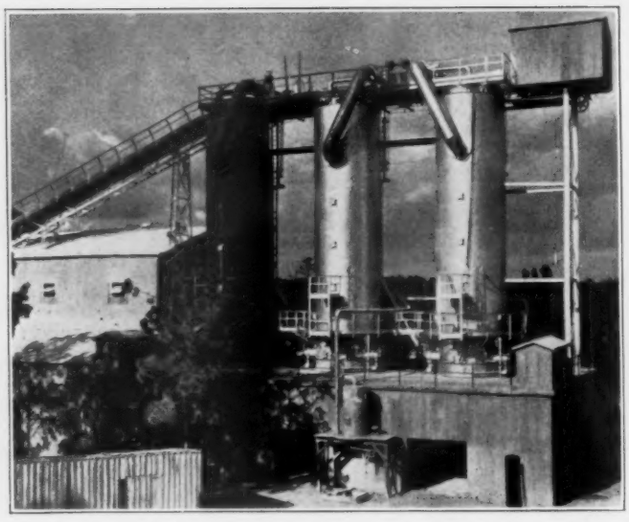
The kiln stone is fed from the storage-bin through arc gates into a 3-cu.yd. Koppel side-dump car similar to the cars used in the quarry. An Allis-Chalmers single-drum hoist on the top of the kilns hauls the car up the incline, where it is dumped through Bartlett & Snow counter-balanced gates into any one of the three vertical kilns. These gates are operated by Hanna Engineering Works air-cylinders.

The kilns are standard shaft-type units with steel outer shells. They are 60 ft. in height from the bottom of the shaft to the top of the chamber. The shaft has vertical walls and is egg-shaped in cross-section, the extreme diameters being 12 ft. and 15 ft. The upper 10 ft. of the shaft of each kiln forms a rock-storage hopper and the top is closed by a counter-balanced gate of the type previously mentioned. Each kiln has a Clarage No. 17 draft fan, running on water-cooled bearings, which draws gases from a point just below the storage-hopper at the top of the shaft. The exhaust temperature varies between 700 and 800 deg. F. Ten specially-designed natural-gas burners are arranged in rows of five on opposite sides of the shaft.

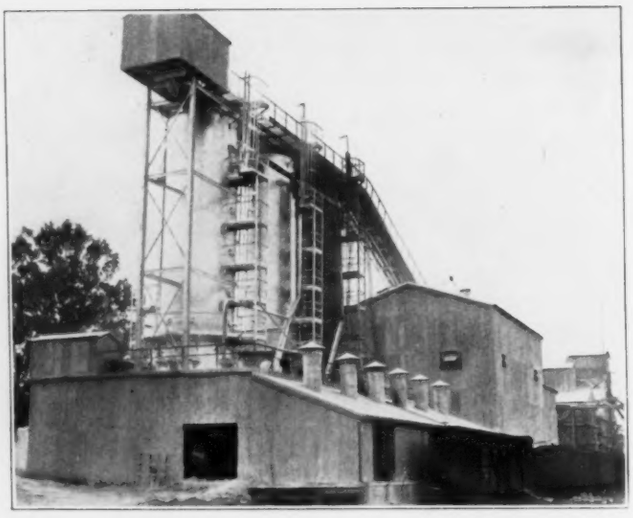
TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE CRUSHED-STONE AND LIME PLANT OF THE LOUISIANA LIME PRODUCTS CORP., EASTON, LA.

(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

	Operation	Key	Equipment	Make	Model No., Size, Capacity or Type	Power Source	Power Transmission
	Raw-rock haulage, washing and separation	1	Skip cars (13) Hoist Track-scale	Koppel Novo Howe	3-cu.-yd. steel, side-dump Single-drum	50-hp. G.E. motor	Gear
		2	Scrubber (Plus 4-in. to 3; ¼-in. to 4-in. to $2a_1$; minus ¼-in. to waste)	Allis-Chalmers	Rotary, 6-ft. by 40-ft.	50-hp. Allis-Chalmers motor	
Lump Lime	Lime burning and handling	3	Bin		150-ton		
		4	Car Hoist	Koppel Allis-Chalmers	3-cu.-yd. steel, side-dump Single-drum	50-hp. Allis-Chalmers motor	A-C Texrope
		5	Kilns (3) Draft fans (3)	Clarage	No. 17, centrifugal	15-hp. Allis-Chalmers motor	Direct
			CO_2 fans (2)	Clarage	No. 21, centrifugal	15-hp. Allis-Chalmers motor	Direct
		6	Truck	Ford	1-ton, dump		
		7	Picking Floor				
		8	Wheelbarrows (To 9 or to cars for shipment)				
Hydrated Lime	Lime crushing, hydration and separation	9	Crusher	Sturtevant	Gyratory	15-hp. electric motor	
		10	Elevator	Link-Belt	Steel-inclosed, bucket	5-hp. electric motor	Chain
		11	Bin		6-ton, steel		
		12	Batcher		Weighing		
		13	Hydrator	Clyde	½-ton, batch-type	Electric motor	A-C Texrope
		14	Conveyor	Link-Belt	Screw		
		15	Elevator	Link-Belt	Steel-inclosed, bucket	Electric motor	Chain
		16	Conveyor		Screw		
		17	Separator (Coarse to $17a_1$; fines to 18)	Sturtevant	7-ft., mechanical	Electric motor	A-C Texrope
	Pulverizing	$17a_1$	Hammer-mill	Sturtevant			A-C Texrope
	Packing		(From 17)				
		18	Bin		18-ton, stee		
		19	Bag-packer (To cars for shipment)	Valve Bag Co.	2-spout	Electric motor	Direct
Commercial Stone	Primary crushing and coarse sizing		(From 2)				
		$2a_1$	Bin		200-ton		
		$2a_2$	Crusher (2)	Webb City	Jaw	40-hp. electric motor (1 G. E.; 1 Westinghouse)	Flat belt
		$2a_3$	Elevator	Allis-Chalmers	Belt-bucket	10-hp. Allis-Chalmers motor	
		$2a_4$	Screen (3 coarse sizes to $2a_4a$; fines to $2a_5$)	Allis-Chalmers	Triple-deck, 4-ft. by 6-ft.	10-hp. Allis-Chalmers motor	A-C Texrope
	Drying, pulverizing and fine screening	$2a_5$	Bins (4)		40-ton capacity each		
		$2a_6$	Drier		Rotary, 3-ft. by 10-ft. gas-fired	5-hp. Allis-Chalmers motor	
		$2a_7$	Pulverizer	Allis-Chalmers	No. 2 Pulverator	40-hp. G.E. motor	A-C Texrope
		$2a_8$	Elevator		Belt-bucket	5-hp. Allis-Chalmers motor	
		$2a_9$	Conveyor		22-in., 30-ft. centers		
		$2a_{10}$	Screen (Grit and agstone to cars for shipment)	Tyler Hum-mer	Double-deck, 4-ft. by 6-ft.	G.E. motor-generator	
	Storage and shipment	$2a_4a$	Stock-piles		Open		
		$2a_4b$	Crane (To cars for shipment)	Mead-Morrison	Gasoline crawler type		
	Hydraulicking and wash water		Quarry sump Sand pump Settling pond Pumps (2)	Georgia Iron Works	6-in., centrifugal	50-hp. G.E. motor	Flat belt
			Nozzles	Allis-Chalmers	720-gal. per min., centrifugal	75-hp. Allis-Chalmers motor 10-hp. G.E. motor	
	Hydrate water		Pump	Lane Louisiana	Deep-well	10-hp. G.E. motor	Direct
	Compressed air		Air-compressor	Gardner-Denver		50-hp. G.E. motor	Direct



The three vertical lime kilns with incline and hydrator building at left. Note pipes to draft fans.



The lime kilns with hoist building in foreground and cars being loaded at right. CO_2 pipe-lines are shown.

CO_2 gas for tempering the burner flame is drawn from the kilns at a point just below the storage-hoppers by two No. 21 Clarage fans. This gas is fed through dampers and pipes to the burners in quantities ranging from 4 to 6 per cent. of the gas feed. Natural gas is brought in through pipes from fields near Monroe, La. The present consumption is about 6,000 cu.ft. per ton of salable lime. Each kiln is equipped with a Foxboro recording gas-volume meter, a draft gage, and a Hays gas-analyzing apparatus which determines the CO, CO_2 and excess O.

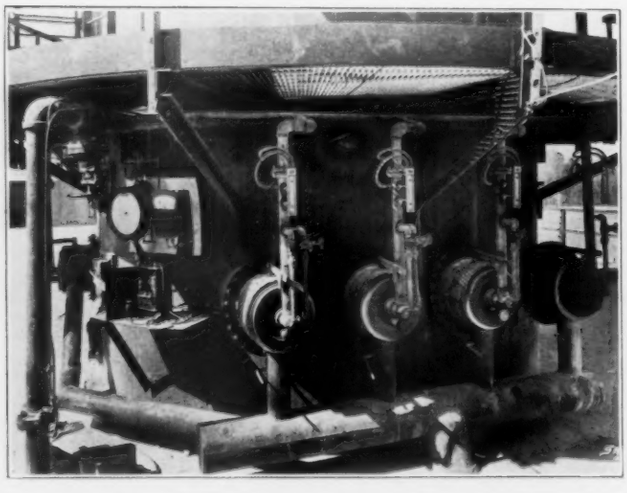
The burned lime is discharged from the kilns through Bartlett & Snow clam-shell gates into a Ford 1-ton dump truck which hauls it to the picking floor, from which the selected lump lime is then wheeled either directly into paper-lined box-cars for shipment or to the hydrating room. Fairbanks platform scales are used to weigh the lime in the wheelbarrows.

The lime to be hydrated is dumped into a Sturtevant gyratory crusher which reduces it to minus ½-in. size. The product is discharged into a steel-inclosed Link-Belt bucket-elevator that empties it into a 6-ton storage bin, from which the lime is sent to a ½-ton capacity Clyde batch hydrator. The hydrated lime is discharged into a hopper from which a short screw-conveyor takes it to another inclosed bucket-elevator. The lime is discharged from the elevator through a spout to a short screw-conveyor feeding a 7-ft. Sturtevant mechanical air-separator. The rejects from the separator go to a small Sturtevant hammer-mill which discharges its product back to the elevator in closed-circuit. The finished product from the separator drops into an 18-ton steel storage-bin which supplies a Valve Bag Co. 2-spout bag-packer.

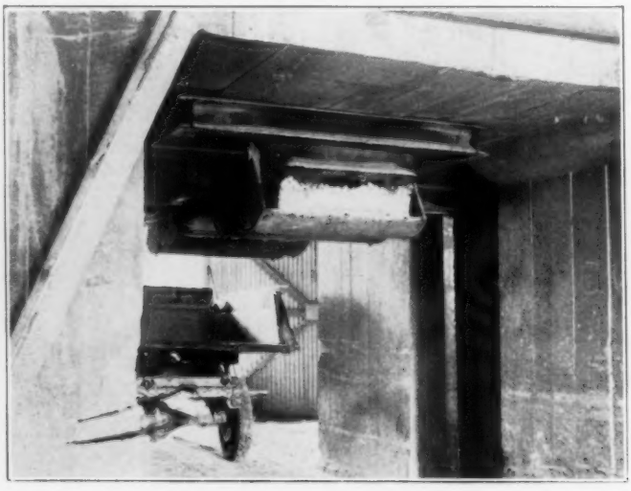
Shipments of lime and stone are made over a 1.8-mi. spur track to Pine Prairie on a branch of the C. R. I. & P. Ry.

The major market for the plant's products is within the state of Louisiana, the bulk of the production being used by water-works, paper-mills, and for masonry work. All the hydrated lime is sold in 40- and 50-lb. bags, although a small number of 10-lb. bags are used.

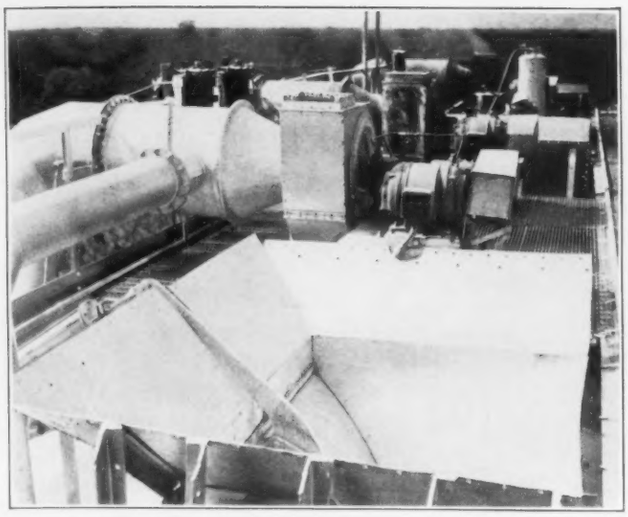
The main office of the Louisiana Lime Products Corp. is in the Commercial National Bank Bldg.,



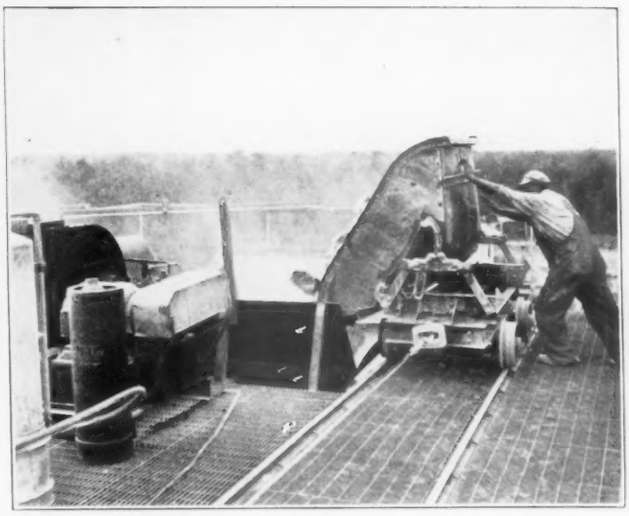
One of kilns at firing floor level. Natural gas burners at right with CO_2 pipes. Control instruments and gas analyzer at left.



The clam-shell type draw gates under one of the vertical kilns. Dump truck hauls lump lime to picking floor.



One of air-operated gates at top of kiln with air-cylinder at left and fans in background.



Dumping car of rock into one of vertical lime kilns. One of draft fans visible at left.

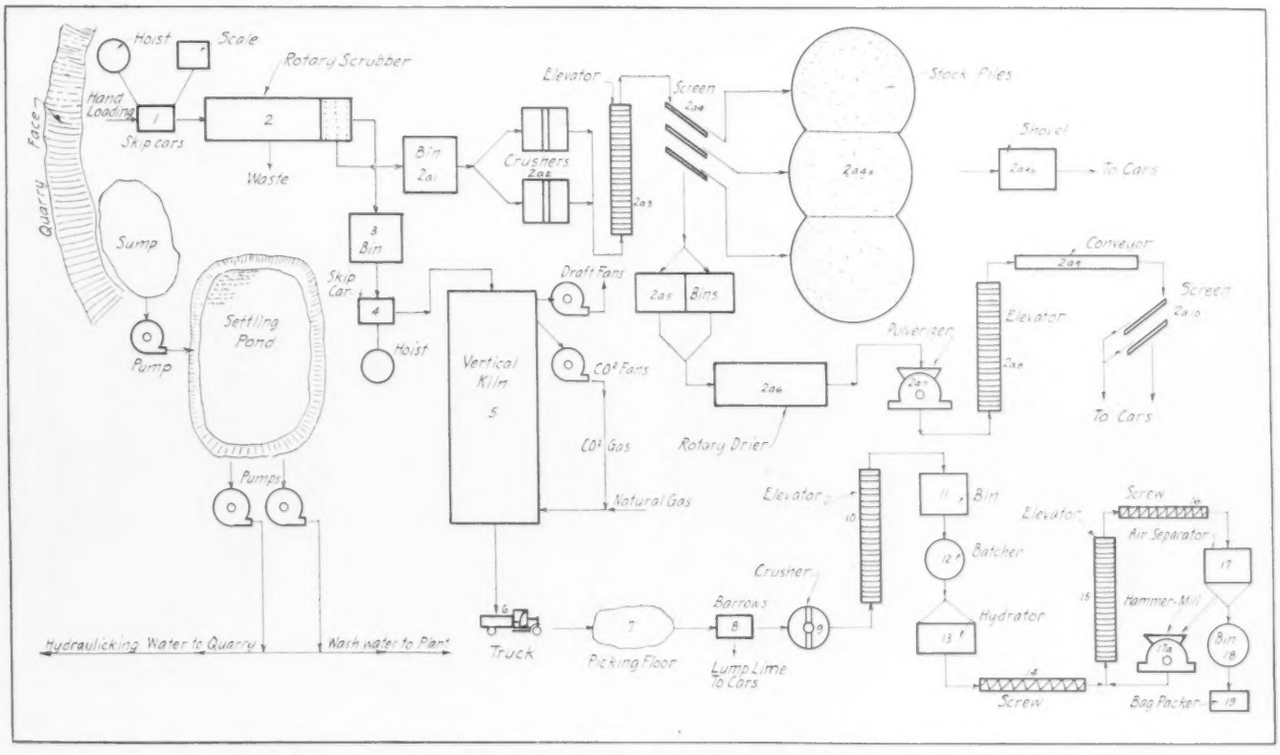
Shreveport, La. The company's officers are: W. G. Gray, president; W. C. Woolf, vice-president; M. VanDer Sluys, secretary; W. G. Ray, treasurer. A. A. Johnson is plant superintendent and J. J. Weatherby is chemical engineer.

Quarry Blast (from page 29)

3 ft. square, and that about 15 lb. of dynamite would be required to break them into usable sizes. The shot moved 4.82 tons of stone per lb. of explosive used at an explosive cost of 2.08c. per ton.

The end breakage was found to be normal but the back breakage was quite severe, particularly in one section where the quarry face was on an inside curve. It was recommended that this back-break tendency might be lessened by decreasing the burden and correspondingly increasing the spacing of the holes.

Drilling for secondary shooting is done with Ingersoll-Rand Jackhamers. Stone is loaded by a Marion No. 490 electric shovel fitted with a 2¼-cu.yd. dipper into Atlas 3-ton all-steel quarry cars. These are hauled in trains of 5 cars each to the primary crusher at quarry level by two Plymouth 7-ton gasoline locomotives and an American 6-ton gasoline locomotive. The plant has a capacity of about 180 tons per hr. and most of its product is used for highways and railroad ballast. It also supplies material for a cold-mixed asphalt plant on the property.



Flow-sheet of the Louisiana Lime Products Corporation's operations at Easton, La.

Diesel Engines Drive Generators in New Missouri Crushed-Stone Plant

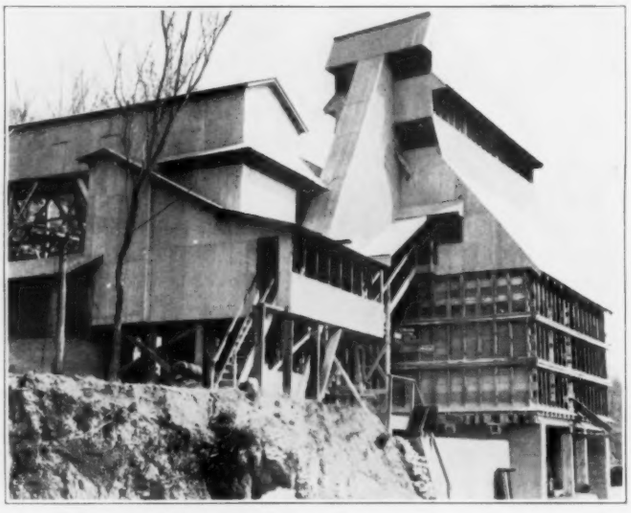
Power Cost for Full Operation Less Than Public-Utility Demand Charge

AN important factor in the aggregate-producing industries of the upper Missouri River Valley is Heumader Quarries, Inc., which in March, 1933, put into operation a new crushed-stone plant near St. Joseph, Mo. This company entered the industry in 1923 with a plant which was operated near St. Joseph until April 7, 1932, when it was almost completely destroyed by fire. It was then decided to abandon the mine at this location and build the new plant at the present site about 1½ mi. south of the old location and 2 mi. northwest of the downtown section of St. Joseph.

W. P. Heumader, owner and general manager of the company, is a firm believer in the economy of plant-generated power. One of the few things saved from the fire was a 2-cyl. Diesel engine which had been used to generate power for the old plant. This now drives the air-compressor at the new plant and a new and larger 3-cyl. engine is used for power generation.

The property consists of 450 acres located along a wooded bluff overlooking the flood plain of Missouri River. Eight distinct ledges of limestone occur in the face of this bluff, but the lowest of them is the only one being worked because it combines the best characteristics for concrete aggregate and agricultural limestone. This ledge is known as the Amazonian formation and is above the Bethany limestone which is mined near Kansas City. The ledge is 14 ft. in thickness and is a massive unbroken formation.

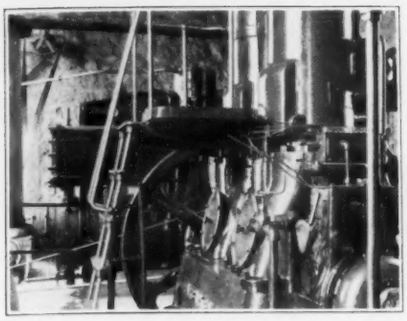
In mining this ledge the upper 4 ft. of rock is left for a roof and a 50-ft. bed of green shale forms the floor. The room-and-pillar method of mining is used, the rooms being 25 ft. square separated by 15-ft. by 20-ft. pillars. Two entries have been worked back about 300 ft., and 10 rooms have been developed. Drilling is done with Cleveland and Gardner-Denver jackhammers equipped with shoulder boards. The stone is brought down by wing shooting. Atlas 25-per cent. quarry gelatin is used to open the rooms and Atlas "B Special" for all other shooting because its slow action is said to create very little dust.



View of plant with truck-loading bins at right. Conveyor from mine at upper left.

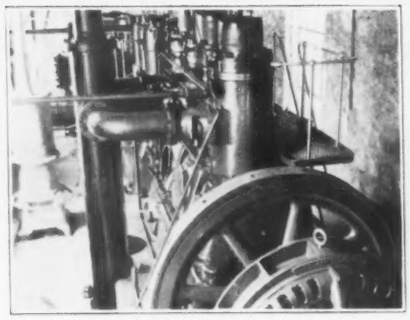
Another view of plant with conveyor from mine at right and car-loading conveyor at left.

Combined power-house, storeroom and shops. Note landscaping work under way.



The 2-cyl., 120-hp. Diesel engine which drives compressor (in background) that supplies air to drills in mine.

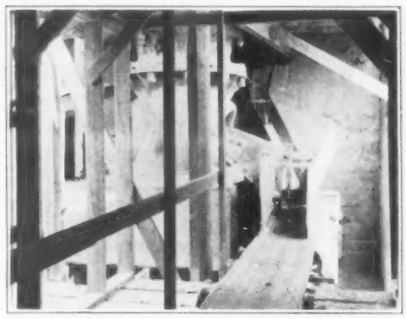
Central switchboard which controls power output of Diesel-engine generating plant. Note safety mat and rails.



Interior of power-house with 125-hp. engine and (in foreground) generator which supplies power for entire plant.

Loading stone by hand in mine into special dump cars which are hauled to plant by mule power.

A room is started by winging and drilling out in fan shape. The holes vary from 4 to 10 ft. in depth, and 7/8-in. steel is used. The bottom holes are drilled in straight about 2 ft. above the shale and the others at 5 ft. with a 45-deg. slope upward. Flat holes were used in driving the mine openings but are now used only when absolutely necessary in order to keep a solid roof. With these methods an average of about 2 tons of stone is obtained for every pound of explosive used.



The gyratory primary crusher and its discharge to horizontal belt-conveyor to main screening building.

Stone is loaded by hand into 3-cu. yd. cars which are drawn by mules. All the cars are weighed on a 15-ton Strait track-scale at the plant and are then dumped by a hand-operated cradle which is automatically righted by springs. A sloping-rail grizzly with 2½-in. openings diverts the large stone to an Allis-Chalmers No. 5 Gates gyratory crusher which reduces it to 2-in. minus. Both the material passing the grizzly and the crusher product are discharged on a 22-in. horizontal belt-conveyor operating on 80-ft. centers.

A 36-in. by 20-ft. revolving screen fitted with perforated plates having 1½-, 1-, 5/8- and ¼-in. holes does the preliminary sizing. The plus 1½-in. stone is discharged through a small hopper fitted with a sliding gate into the Allis-Chalmers No. 3 Gates secondary gyratory crusher. The chutes under this screen are so arranged that any of the other sizes produced can also be fed to this crusher. The minus ¼-in. material coming from this screen is taken by a belt-conveyor to the dust or grit bin. The remainder of the material produced by this screen, together with the secondary-crusher product, is discharged on a belt-bucket-elevator operating on 55-ft. centers.

The revolving screen receiving the elevator discharge is a 48-in. by 22-ft. unit equipped with perforated plates having ¾-, 5/8- and ½-in. holes on the main barrel and a dust jacket with 5/16-in. holes. All sizes are ordinarily chuted direct to bin storage with chutes arranged so that any size can be stored in any desired bin compartment. A 22-in. belt-conveyor operating on 40-ft. centers is so arranged that the ¾-in. plus material can be returned to the secondary crusher for further reduction.

Trucks are loaded from two sets of three-compartment bins storing dust, chats, grit and three sizes of coarse aggregate. Between these bins are two large bins which discharge to a reclaiming belt-conveyor running in a concrete tunnel under the plant and roadway. This emerges at the edge of the hill, where it discharges over a 5/16-in. stationary screen, which takes out the dust created in handling and discharges the stone into cars on a siding of the C. B. & Q. Ry. below the plant. The dust is collected in a hopper which discharges into trucks. All truck shipments are weighed on a 38,000-lb. Strait truck-scale at the plant office.

The power demand charge imposed by local public utilities is said to be unreasonably high. According to Mr. Heumader, he is able to generate his own current for full-capacity operation of the plant for less than the demand charge which would be imposed when the plant is idle. The saving when operating at capacity is, of course, even greater.

The power-plant is housed in an extremely attractive building near the plant. It is made of local stone and also houses the storeroom and blacksmith and machine shops. The appearance of this building harmonizes well with the work being done by the company in beautifying its property. Drives have been laid out and a private park has been formed on the hill above the mine, where Mr. Heumader is also building a residence. This adjoins a park recently completed by the city.

The 440-v. current used throughout the plant is supplied by a 125-kv.-a. 100-kw. Fairbanks-Morse alternator which is driven by a direct-connected

150-hp. Fairbanks-Morse 3-cyl. Type Y Diesel engine. A 120-hp., 2-cyl. engine of the same make drives a Sullivan 1,000-cu. ft. per min. angle-compound air-compressor which supplies air for drilling. Each engine has an individual electric-motor-driven pump for cooling water. Fuel oil is stored in a tank which is outside the building and has a 1-car capacity.

The plant was designed by Mr. Heumader in coöperation with H. B. Thompson of Kansas City, whose forces also assisted in the erection of the plant. The plant is entirely of concrete-and-timber construction and has a capacity of about 70 tons per hr. All equipment is driven by Allis-Chalmers electric motors. A 50-hp. motor drives the primary crusher while the first belt-conveyor, the reduction crusher, scalping screen and dust conveyor are all driven by one 30-hp. motor. A 20-hp. motor drives the elevator and the sizing screen, a 5-hp. motor drives the return conveyor, and the loading conveyor is driven by a 10-hp. motor. Belt and chain drives are used throughout and the belt-conveyors are all equipped with Timken roller-bearing idlers.

Code Labor Rules *(from page 28)*

industries. In the rock- and slag-wool industry work of this kind is limited to 44 hr. a week and in the fullers' earth, marble and mica industries to 48 hr., while five other industries make no distinction between these and other workers.

Watchmen.—Watchmen are generally allowed to work long hours—64 hr. a week in the limestone and sandstone industries; 60 hr. in the crushed-stone, sand-and-gravel and slag and the ready-mixed-concrete industries; 56 hr. in the gypsum, marble, natural-cleft-stone, rock- and slag-wool, roofing-granule, sand-lime-brick, soft-lime-rock and talc-and-soapstone industries; and 54 hr. in the mica industry. A tolerance of 10 per cent. additional hours, above the general requirements, is allowed watchmen in the asbestos industry. The remaining six industries have no special provisions for watchmen (Table III).

Delivery and Shipping.—Packing, shipping and delivery employees are sometimes given longer weeks than the general provision allows. Thus, shipping employees may work 45 hr. a week in the marble industry, 48 hr. (6 days in 7) in the limestone industry, and 56 hr. in the slate industry. Delivery men (truck drivers) may work 44 hr. in the ready-mixed-concrete and rock- and slag-wool industries, 45 hr. in the marble industry, 48 hr. in the limestone industry and 56 hr. in the slate industry. The asbestos industry allows a 10-per cent. tolerance for these classes of workers.

Engineers, firemen and pumpmen may work 44 hr. weekly in the rock- and slag-wool industry, and 48 hr. in the gypsum, fullers' earth, marble and mica industries. Here, again, the asbestos industry has a 10-per cent. tolerance. In the limestone industry a tolerance of 2 hr. a week in excess of the general provision is allowed.

Continuous Processes.—The exceptional nature of continuous processes is recognized in the provisions of the refractories, roofing-granule and sand-lime-brick codes. In the last-named industry the provision is ½ hr. more daily or 3 hr. more weekly than the general 40-hr. provision for employees (not more than 2 in each plant) necessary for closing "hardening" cylinders. In the refractories industry the maximum is 48 hr. The roofing-granule industry has the same maximum and an alternative of 9½ hr. in 24; kiln-drying and kiln-burning workers, when no relief worker is available, may work 8 hr. additional in a week, but the maximum is 192 hr. in any 4 weeks.

Office and Clerical Workers.—Ten industries make no special provisions for the hours of office and clerical workers, and the 10 that do are fairly well agreed on 40 hr. as the proper maximum; the one exception is the crushed-stone, sand-and-gravel and slag industry, whose maximum is 42 hr. In practically all the other ten industries having the 40-hr. maximum, this is the same as the general maximum; in the cement industry—the only exception—the maximum is 4 hr. longer than the general maximum of 36 hr.

Overtime.—Only two industries (mica and refractories) have no provisions for overtime pay. In the others the rate is 1⅓ times the regular rate in 10 industries and 1½ times in 7 industries. The point at which overtime pay begins varies greatly in different industries and even within a single industry, as the data in Table III show. Eight industries, or about half of the 18 having overtime provisions, begin to calculate overtime pay at the end of 40 hr. of work, the slate industry begins at 45 hr., and three other industries start either at 48 hr. a week or 8 hr. a day. The cement industry considers all work after 35 hr. a week, averaged over one-half a calendar year, as overtime and payable at 1⅓ times the regular rate.

Child Labor.—The provisions of all the codes herein considered reflect the requirements of the National Industrial Recovery Act with regard to the employment of children. The legal limit of 16 yr. is embodied in all codes except those of the slate and the natural-cleft-stone industries, where the limit is 18 yr. Special provisions for hazardous occupations are included in all codes except the lime and the slate industries', the first of which was approved before the N.R.A. had adopted a policy on this subject. In all 20 industries except lime 18 yr. is the minimum limit fixed for employment in hazardous occupations (Table I). In the gypsum code these are described as "mining, quarrying or milling operations," in the refractories industry as "underground mining operations," in the roofing-granule industry as "manufacturing or mining operations," and in the talc-and-soapstone industry as other than "clerical, office, sales, service, technical and engineering departments."

In most of the codes approved since November of 1933 unhealthful occupations have been included with hazardous occupations, the usual provision describing these as "operations or occupations hazardous in nature or detrimental to health." This is the standard phraseology adopted by the N.R.A.

MEN OF THE INDUSTRY

WILLIAM C. DAVIS

WILLIAM C. DAVIS, manager of Industrial and Lime Sales, United States Gypsum Co., Chicago, Ill., was born January 3, 1885. After completing courses in Liberal Arts at Western Kentucky State Teachers' College and in Civil Engineering at the University of Kentucky he engaged in railroad-, irrigation- and structural-engineering work in western states. During the war he served as a first lieutenant of Engineers in the U. S. Army. In May, 1919, he joined the U. S. Gypsum Co. in a sales capacity and three years later was made eastern manager of the Contracting Division. January 1, 1927, he became assistant manager in charge of engineering of the Gypsum, O., plant. January 1, 1931, he was made manager of Sales Personnel and on June 1, 1932, was promoted to his present position.

Personal Mention

H. A. Stevenson, 7310 Woodward Ave., Detroit, Mich., has recently been appointed Loadmaster distributor in the Detroit territory for the Bucyrus-Erie Co., South Milwaukee, Wis.

Daniel B. Worth, chief engineer of The Whitcomb Locomotive Co., Rochelle, Ill., has joined the Engineering Dept. of The Baldwin Locomotive Works, Philadelphia, where he will be identified with the engineering of Baldwin and Whitcomb electric and internal combustion locomotives. **Edward P. Hachtel,** Whitcomb Production Engineer, remains at Rochelle where he will be in charge of inspection and will provide engineering content with the Whitcomb shops.

Maj. J. Calvin Shumberger, controller of the Lehigh Portland Cement Co., Allentown, Pa., was unanimously elected president of the Controllers Institute of America, at a recent meeting of that organization in New York City.

Henry Koessler recently sailed from New York City to Rio De Janeiro, Brazil, where he will have charge of quarry at the Brazil plant of the International Cement Corp. **R. J. Elledge,** formerly superintendent of the Lone Star plant at Limedale, Ind., is in charge of the Rio De Janeiro plant.

D. K. Miers has succeeded **W. A. Hubbard** as vice-president and manager of the Gingsland Granite Co., Madera, Cal.

J. S. Mosher has been appointed district manager of the Ohio Power Shovel Co., of Lima, O., and has his offices in the Strauss Bldg., Chicago. For the ten years preceding his joining the Ohio organization he was connected with the sales division of the Bucyrus-Erie Co. in Atlanta, Ga., where he covered the southeastern territory, as well as the Mississippi levee work from Cairo to New Orleans. Prior to his work with Bucyrus-Erie he spent several years as construction engineer and superintendent on various construction projects.

Fred A. Weibel, secretary-treasurer of the Allentown Portland Cement Co., Allentown, Pa., in speaking before the Lions Club at Reading, Pa., on Oct. 11, stated that highway sidewalks for the protection of pedestrians and motorists will be one of the important construction projects of the near future.

Edwin Tomlin, managing director and treasurer of the British Columbia Cement Co., Ltd., Victoria, B. C., recently returned from an extended trip to Europe.

Robert B. Dickinson, formerly vice-president and general manager of the Marquette Cement Mfg. Co., Chicago, Ill., recently left for England where it is reported that he will be in charge of operations for the Alpha Cement Co., Ltd., London, England. This company was recently formed as a merger of several cement companies. **A. Y. Gowen,** a former vice president of the Lehigh Portland Cement Co., is managing director of the Alpha Cement Co.

Charles E. Stuart, president and treasurer of Tyson Roller Bearing Corp., Massillon, O., has resigned after five years spent in organization and operation of the plant which manufactures the Tyson cageless tapered roller bearing. He will remain on the board of directors. **Russell E. Colgate,** who has been chairman of the board, has been elected president and treasurer, succeeding Mr. Stuart. **Ralph H. Maxson** is executive vice president in charge of operations; George C. McMullen is vice president in charge of sales; **George Neupower,** secretary and **E. R. Earnest,** assistant treasurer and purchasing agent.

L. M. Klinedinst was elected a member of the board of directors of the Timken Roller Bearing Co., Canton, O., at a recent meeting, and was also promoted to the office of vice president in charge of sales to fill the vacancy caused by the resignation of Judd W. Spray.

Francis D. Bartow was elected a member of the board of directors of the General Electric Co., Schenectady, N. Y., at a recent meeting of that body.

Obituary

Frank T. Gucker, 64, president and general manager of the John T. Dyer Quarry Co., Norristown, Pa., died Oct. 6. Mr. Gucker was for many years active in the affairs of the National Crushed Stone Assn., and was at the time of his death its treasurer and a director. He was also prominent in the affairs of the Pennsylvania Stone Producers' Assn. and in the code activities of the mineral aggregates industries.

Henry F. G. Wulf, 63, president and general manager of the Monarch Cement Co., died of heart disease at his office in Humboldt, Kan., Oct. 19. Mr. Wulf lived most of his life in Kansas and was well known among building material men, contractors and others in Kansas City.

William Walter Hartsock, 64, Monroe County, Ind., stone quarry foreman, died of paralysis on Oct. 7 after an illness of several months.

William Penn, 73, president and founder of the William Penn Stone Co., Minneapolis, Minn., and also connected with the Independent Limestone Co. at Bloomington, Ind., died at his home in Indianapolis on Oct. 15.

Alfred Buchanan, 49, mill foreman at the California Portland Cement Co. plant, Colton, Cal., for 16 years, died on Oct. 10 following a short illness.

W. S. Keller, owner of the Empire Sand & Gravel Co., Marshalltown, Ia., died on Sept. 9. **Mrs. Josie F. Keller** was bequeathed the ownership of the business.

Franklin M. Bowman, 65, vice president of the Blaw-Knox Co., Pittsburgh, Pa., died recently at his home in that city. He was in charge of the transmission tower and structural steel divisions of the company.

W. E. Gardner, general traffic manager of the North American Cement Corp., Albany, N. Y., died recently at his home in New York City.

August H. Hesse, superintendent, Scott County Gravel Pit, Donahue, Ia., was killed in an auto accident on August 2. **J. W. Hesse** has been appointed to succeed him as superintendent.

John E. Russell, president of Concrete Pipe Limited, with plants in Toronto and Woodstock, Ont., died recently from burns received in an oil explosion in Toronto.

▼ *Coming Events* ▲

December 6-7, 1934, Washington, D. C.—Fourteenth Annual Meeting, Highway Research Board. National Academy of Sciences Bldg.

January 8-11, 1935, Washington, D. C.—Annual convention and show, American Road Builders' Assn., Willard Hotel, Washington.

January 27, 1935, Chicago, Ill.—Independent annual meetings of the directors of the national crushed stone, sand and gravel and slag associations. Palmer House.

January 28, 1935, Chicago, Ill.—Meeting of the Code Authority of the mineral aggregates industries. Palmer House.

January 28-31, 1935, Chicago, Ill.—Independent conventions of National Sand & Gravel Assn., National Crushed Stone Assn., and National Slag Assn. with some joint sessions. Palmer House.

February 1, 1935, Chicago, Ill.—Meeting of Executive Committee or Council of the Code Authority of the mineral-aggregates industries. Palmer House.

New Corporations

NORTH PROVIDENCE SAND & GRAVEL CORP., Providence, R. I. Capital, $1,500, divided into 15 shares common at $100 each. Incorporators, Ernesto Di Biasio, Renaldo Di Biasio, and John Skouras, Providence.

THE FRANCE SLAG CO., Cleveland, O. Capital of 250 shares of n.p.v. Incorporators are C. V. Wolfe, R. H. Rogers, and A. C. Ehrenfried, all of Toledo, O.

THE PINE MOUNTAIN SAND & GRAVEL CO., Whitesburg, Ky. Capital, $10,000. Incorporators are Archie V. Sergent, Marie L. Sergent, Nellie Sergent, Gordon R. Lewis, James P. Lewis, and Carroll Lewis.

BOUNTAIN SAND & GRAVEL CO., INC., Great Barrington, Mass. Capital, $25,000. Incorporators, Robert K. Wheeler, Henry P. Tobey, and James F. Watson, all of Great Barrington.

SOMMERS, BOLLEN & ATWOOD, Geneseo, Ill. To operate gravel business. Incorporators, B. E. Sommers, John Bollen, and Charles H. Atwood.

THE KAMPESKA MATERIALS CO., INC., Watertown, S. D. Capital $25,000. Incorporators, D. C. Noonan, W. F. Hesse, and S. P. Williamson. To deal in sand, gravel, stone and other building materials.

THE LEESBURG LIME & FUEL CORP., Leesburg, Va. Capital $15,000. Incorporated by Frank Osburn and others.

THE WEST VIRGINIA LIME CORP., Charleston, W. Va. Capital $10,000. Incorporators, S. G. Proffit, Floyd, Va.; Paul H. Jamison, Charlestown, W. Va., and others.

Aggregates Statistics

THE total sand and gravel reported as sold or used by nearly 2,000 commercial producers in the United States in 1933 amounted to 66,106,472 short tons valued at $39,395,027, a decrease of 22.5 per cent. in quantity and 17.0 per cent. in value for 1932. In addition, the production of sand and gravel from more than 550 state, county, and municipal operations was reported to the Bureau of Mines; the quantity of this material totaled 41,648,877 short tons and the value $13,677,883, increases from 1932 of 19.9 per cent. and 36.3 per cent. respectively. The total output of sand and gravel accounted for in the canvass by the Bureau of Mines for 1933 was therefore 107,755,349 short tons, valued at $53,072,910.

Because of the sharp increase in production reported by noncommercial agencies, this total is slightly higher than the preliminary figure of 104,000,000 short tons given in PIT AND QUARRY, May, 1934, pp. 43-44. The output reported by commercial plants, however, was 6.9 per cent. lower than that indicated by preliminary data.

Noncommercial Production.—Complete statistical coverage of sand and gravel production by states, counties, and municipalities is impossible without a large expenditure for field work. For 1933, however, a special attempt was made to canvass every local government agency and, as a result, returns from many additional counties or municipalities are included in the total of 41,648,877 short tons of material shown as noncommercial. Returns from only those sources comparable to 1932 indicate that noncommercial production in 1933 was virtually equal to that in 1932; the increase in 1933 can be attributed directly to more complete statistical coverage.

Less than one-third—8,057,448 short tons in 1932 and 13,645,409 short tons in 1933—of the sand and gravel produced by government agencies is washed, screened, or otherwise prepared to make it comparable in quality with the output of the average commercial plant. By far the larger part consists of pit-run material having a low unit value. The average value of all noncommercial sand and gravel in 1933 was 33 c. a ton contrasted with 60 c. a ton for the commercial output.

Railroad Ballast.—All railroad ballast is included in this report under commercial production. In 1933 1,232,795 short tons of ballast gravel valued at 20 c. a ton was produced by or directly for the railroads for their own use. This quantity is equivalent to 22.7 per cent. of total ballast gravel.

Preparation.—The percentage of prepared material included in the total

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Bureau of Mines, Department of the Interior

for sand and gravel dropped to 66.9 per cent. in 1933, principally as a result of the increase in quantity of unprepared material reported by government agencies. This prepared sand and gravel, 72,058,631 short tons, includes only 13,645,409 tons contributed by noncommercial sources. Prepared material in 1933 comprised 88.4 per cent. of the commercial production but only 32.8 per cent. of the noncommercial output.

Transportation. — Producers were asked to report the method of transporting their product during 1933. Replies received covered 98,482,383 short tons, 91.4 per cent. of the total recorded production of sand and gravel. Of this quantity 8 per cent. was transported by waterways, 32 per cent. by railways, and 60 per cent. by highways.

Salient statistics of the sand and gravel industry for 1932 and 1933 are summarized in the accompanying table.

Marion Celebrates 50th Anniversary of Founding

The Golden Anniversary of the founding of the Marion Steam Shovel Co., Marion, O., is commemorated by the 50th Anniversary Number of "The Groundhog," official magazine of the company. This 24-page issue is illustrated with photographs of the company's products from the time the first shovel was built in 1884 up to the present time, and reviews the various industrial fields which use shovels.

SAND AND GRAVEL SOLD OR USED BY COMMERCIAL AND NONCOMMERCIAL PRODUCERS IN THE UNITED STATES, 1932 AND 1933, BY USES

USE	1932			1933			Percentage of Change in:	
	Quantity (*short tons*)	Value		Quantity (*short tons*)	Value			
		Total	Average		Total	Average	Tonnage	Total Value
COMMERCIAL OPERATIONS								
Sand:								
Glass	1,370,255	$2,266,564	$1.65	1,781,423	$3,011,023	$1.69	+30.0	+32.8
Molding	1,118,146	1,051,702	.94	[1]1,718,251	[1]1,558,738	.91	+53.7	+48.2
Building	14,597,631	7,507,700	.51	[1]13,024,174	[1]6,496,180	.50	−10.8	−13.5
Paving	17,194,553	7,622,597	.44	10,903,447	5,544,368	.51	−36.6	−27.3
Grinding and polishing	419,691	638,556	1.52	572,735	739,222	1.29	+36.5	+15.8
Fire or furnace	36,698	54,371	1.48	[1]106,133	[1]121,149	1.14	+189.2	+122.8
Engine	1,151,011	688,563	.60	[1]1,051,695	[1]623,285	.59	− 8.6	− 9.5
Filter	68,035	92,751	1.36	24,387	52,186	2.14	−64.2	−43.7
Other [2]	4,486,655	1,463,650	.33	[1]1,842,652	[1]695,189	.38	−58.9	−52.5
Total sand	40,442,675	21,386,454	.53	31,024,897	18,841,340	.61	−23.3	−11.9
Gravel:								
Building	13,064,368	9,549,698	.73	11,934,080	8,084,995	.68	− 8.7	−15.3
Paving	25,137,550	14,728,893	.59	17,719,859	10,403,150	.59	−29.5	−29.4
Railroad ballast [3]	6,644,483	1,823,993	.27	5,427,636	2,065,542	.38	−18.3	+13.2
Total gravel	44,846,401	26,102,584	.58	35,081,575	20,553,687	.59	−21.8	−21.3
Total sand and gravel	85,289,076	47,489,038	.56	66,106,472	39,395,027	.60	−22.5	−17.0
NONCOMMERCIAL OPERATIONS [4]								
Sand:								
Building	147,636	97,283	.66	163,257	84,131	.52	+10.6	−13.5
Paving	2,204,564	1,013,337	.46	1,972,692	751,201	.38	−10.5	−25.9
Total sand	2,352,200	1,110,620	.47	2,135,949	835,332	.39	− 9.2	−24.8
Gravel:								
Building	1,000,702	253,931	.25	650,873	253,529	.39	−35.0	− 0.2
Paving	31,395,919	8,668,487	.28	38,862,055	12,589,022	.32	+23.8	+45.2
Total gravel	32,396,621	8,922,418	.28	39,512,928	12,842,551	.33	+22.0	+43.9
Total sand and gravel	34,748,821	10,033,038	.29	41,648,877	13,677,883	.33	+19.9	+36.3
COMMERCIAL AND NONCOMMERCIAL OPERATIONS								
Sand	42,794,875	22,497,074	.53	33,160,846	19,676,672	.59	−22.5	−12.5
Gravel	77,243,022	35,025,002	.45	74,594,503	33,396,238	.45	− 3.4	− 4.7
Grand total	120,037,897	$57,522,076	$0.48	107,755,349	$53,072,910	$0.49	−10.2	− 7.7

[1] To avoid disclosing figures, small amounts of molding, engine, and fire or furnace sands are included with building and other sands.

[2] Includes some sand used for railroad ballast and fills. The quantity of sand reported as used exclusively for railroad ballast was as follows: 1932, 995,783 tons valued at $184,196; 1933, 500,137 tons valued at $152,882.

[3] Includes some gravel used for fills and other purposes. The quantity of gravel reported as used exclusively for railroad ballast was as follows: 1932, 5,113,862 tons valued at $1,513,240; 1933, 4,668,597 tons valued at $1,747,452. The foregoing figures for ballast include that produced by railroads for their own use, amounting in 1932 to 2,140,154 tons valued at $293,328; in 1933 to 1,232,795 tons valued at $247,522.

[4] By states, counties, municipalities, and other government agencies, directly or under lease.

Latest Portland-Cement Statistics

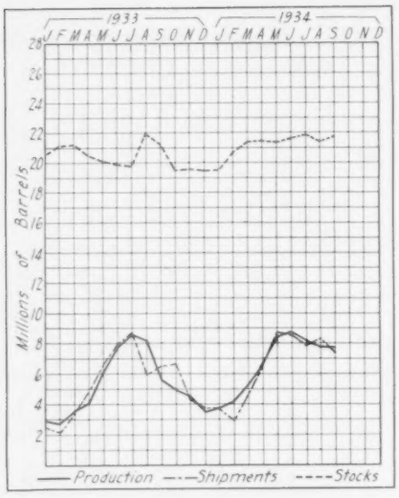


Chart showing monthly production, shipments and stocks on hand at end of month from January, 1933, to September, 1934.

THE Portland-cement industry in September, 1934, produced 7,680,000 bbl., shipped 7,388,000 bbl. from the mills, and had in stock at the end of the month 21,716,000 bbl. Production in September, 1934, showed an increase of 36.2 per cent. and shipments an increase of 13.4 per cent., as compared with September, 1933. Stocks at the mills were 2.4 per cent. higher than a year ago.

These statistics are compiled from reports received from all manufacturing plants except one, for which an estimate has been included in lieu of actual returns.

In the following statement the total output of finished cement is compared with the estimated capacity of 163 plants at the close of September, 1934, and of 164 plants at the close of September, 1933.

RATIO (*per cent.*) OF PRODUCTION TO CAPACITY

	September		Aug.	July	June
	1933	1934	1934	1934	1934
The month..	25.5	34.8	34.5	35.7	39.8
The 12 months ended	25.5	27.6	26.8	26.9	27.1

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1933 AND 1934 (*in thousands of barrels*)

Month	Production		Shipments		Stocks At End of Month	
	1933	1934	1933	1934	1933	1934
January	2,958	3,779	2,502	3,778	20,624	19,547
February	2,777	4,168	2,278	2,952	21,125	20,762
March	3,684	5,257	3,510	4,618	21,298	21,422
April	4,183	6,544	4,949	6,492	20,542	21,557
May	6,262	8,554	6,709	8,784	20,117	21,301
June	7,804	8,786	7,979	8,539	19,936	21,600
July	8,609	8,134	8,697	7,893	19,848	21,852
August	8,223	7,863	5,994	8,297	22,078	a21,424
September	5,638	7,680	6,517	7,388	21,216	21,716
October	5,037	.....	6,750	.....	19,502	.....
November	4,672	.....	4,463	.....	19,709	.....
December	3,526	.....	3,738	.....	a19,541	.....
Totals...	63,373	.....	64,086	.....	.....	.....

a Revised.

DISTRIBUTION OF CEMENT (*a*)

Shipped to—	July		August		Shipped to—	July		August	
	1933	1934	1933	1934		1933	1934	1933	1934
Alabama	64,120	76,085	43,833	58,083	New Jersey	262,251	285,365	136,598	296,701
Alaska	1,959	2,856	1,153	1,830	New Mexico	15,563	25,090	10,334	29,547
Arizona	7,364	15,544	7,173	18,525	New York	1,161,461	978,403	671,520	1,046,116
Arkansas	41,330	55,399	37,875	54,408	North Carolina	64,219	80,208	28,750	80,785
California	396,165	371,962	467,953	465,329	North Dakota	23,618	33,435	8,634	30,352
Colorado	41,755	64,350	62,639	54,310	Ohio	445,180	411,800	224,994	387,150
Connecticut	112,051	105,321	52,886	100,394	Oklahoma	122,487	115,418	65,182	116,089
Delaware	1a,933	31,607	3,729	34,295	Oregon	22,860	52,380	29,112	56,553
Dist. of Col.	97,056	94,185	92,921	103,254	Pennsylvania	687,614	584,073	365,210	588,029
Florida	50,788	54,516	40,668	68,860	Porto Rico	15,645	12,261	7,088	28,739
Georgia	63,813	91,422	29,751	100,561	Rhode Island	51,412	49,123	11,673	35,258
Hawaii	12,794	13,482	9,728	9,172	South Carolina	27,886	28,677	10,640	36,758
Idaho	10,144	21,717	12,859	19,775	South Dakota	34,892	41,909	11,546	77,908
Illinois	1,124,429	512,159	996,408	545,571	Tennessee	86,048	101,964	39,283	158,610
Indiana	357,953	323,604	238,572	280,620	Texas	248,184	275,683	210,589	273,028
Iowa	210,017	237,122	142,845	250,414	Utah	26,258	18,483	38,615	22,408
Kansas	123,059	114,941	60,913	93,270	Vermont	26,815	25,367	12,785	35,735
Kentucky	152,711	125,254	135,378	140,881	Virginia	133,612	126,463	56,154	140,236
Louisiana	47,917	91,859	28,325	91,485	Washington	66,370	101,887	84,254	116,244
Maine	71,464	30,862	35,521	34,026	West Virginia	74,336	102,598	49,891	114,309
Maryland	93,838	161,833	74,145	141,347	Wisconsin	370,525	338,500	176,011	347,459
Massachusetts	223,632	191,942	121,269	267,319	Wyoming	9,904	15,394	5,924	23,461
Michigan	419,326	365,756	287,724	342,974	Unspecified	0	63	0	6,601
Minnesota	192,668	202,247	137,415	243,654		8,641,177	7,857,078	5,928,970	8,201,591
Mississippi	72,004	79,266	60,345	24,962	Foreign countries	55,823	35,922	65,030	35,409
Missouri	369,385	177,605	230,012	210,729	Total shipped from cement plants	8,697,000	7,893,000	5,994,000	8,237,000
Montana	18,330	37,841	12,275	30,700					
Nebraska	78,106	95,554	33,921	101,600					
Nevada	136,152	262,265	184,288	224,548					
New Hampshire	57,774	43,978	31,659	40,489					

a Includes estimated distribution from 3 plants in July and August, 1933; from 2 plants in July, 1934; from 1 plant in August, 1934.

Test Internal-Combustion Engines by New Methods

The Internal Combustion Engine Institute, 111 West Monroe St., Chicago, Ill., announces that it now has available for distribution copies of a standard testing and rating procedure for internal-combustion engines for industrial applications. A committee of engineers appointed by the board of directors of the institute has been in session for months studying this question. The recommendations of this committee were submitted to the directors early in the summer and have since been approved and adopted.

The adoption of this procedure was decided upon because the lack of any uniform testing methods in the past had resulted in a wide diversity of procedure, inconvenient and confusing to buyers and often discouraging and unfair to reputable engine manufacturers. In their study of the subject the committee members gave careful consideration to the subject of equipment, fuels, barometer and temperature readings, altitude, and intermittent and continuous service ratings.

Bulletin Describes Tests for Filter Respirators

The U. S. Bureau of Mines, Dept. of the Interior, Washington, D. C., has issued a new schedule on *Procedure for Testing Filter-Type Dust, Fume, and Mist Respirators for Permissibility.* This schedule prescribes the rules and regulations under which the tests or investigations are made by the Bureau and prescribes a reasonable fee to cover the necessary expenses. Any respirator passing the inspection and tests of the Bureau of Mines is considered permissible.

As regards their design and approval, respirator filters are divided into classes according to the type of atmospheric particulate matter they are designed to protect against. There are three general classes: dust, fume, and mist; additional classes consisting of combinations of these types; and another class consisting of combinations of all these types.

Bucyrus-Erie Appoints New Colorado Distributor

Bucyrus-Erie Co. of South Milwaukee, Wis., announced the appointment of Ray Corson-Elkins Co. of Denver, Colo., as Loadmaster distributors for the State of Colorado. This new distributor is located at 1611 Wazee Street.

Lime Shipments

THE downward trend in lime shipments, begun in June and continued in July, was checked in August. From the year's "peak" month of June, when shipments totalled 167,015 tons, they fell to 116,985 tons in July (Table I). The August recovery raised the month's shipments to 128,750 tons. This reversal of the trend was almost as extensive as, but even more important than, the one which came in March, when the February shipments of 110,934 tons were bettered by a record of 142,414 tons.

The principal gain of the month occurred in the shipments of agricultural lime, which amounted to 18,794 tons in August. The increase above July's figure of 8,151 tons was more than 130 per cent. So far this year August shipments were exceeded only by those of April and May. A smaller gain occurred in building-lime shipments, which rose from 24,226 tons in July to 26,418 tons in August. Shipments of chemical lime declined from 84,608 tons in July to 83,538 tons in August, the lowest point so far this year.

Of July's total shipments agricultural lime constituted 14.6 per cent., building lime 20.5 per cent., and chemical lime 64.9 per cent.

Prices remained about where they had been. In August the average reported price of all lime was $7.86 a ton, just 1c. higher than the June average (Table II). The average price of all agricultural lime in August was $8.32, of all building lime $10.64, and of all chemical lime $6.88. Average prices for quicklime shipped in bulk ranged from $5.16 for agriculture to $6.13 for chemical and $7.97 for building lime, giving an average of $6.22. The prices of quicklime in barrels ranged from $14.51 for chemical to $16.88 for building and $18.01 for agricultural, averaging $16.49 for all. The prices of quicklime in bags ranged from $8.88 for chemical to $9.07 for agricultural and $12.51 for building, the average being $10.27. Hydrate prices averaged $8.64, ranging from $8.58 for agricultural to $8.83 for chemical and $9.13 for building lime.

The ratio of shipments to capacity fell to 32.8 in August for the industry as a whole (Table III). The lowest ratio (19.0) occurred in District 1 (New England, eastern New York) and the highest (43.1) in District 7 (Illinois, Indiana, eastern Missouri).

Table I.—SHIPMENTS OF LIME IN 1934, BY KINDS AND USES (*tons*)

Month	Kinds[1]	Uses			Totals
		Agriculture	Building	Chemical	
1934					
January	Quicklime	547	7,544	71,359	79,450
	Hydrate	3,171	11,062[2]	18,029	32,262
	Totals	3,718	18,606	89,388	111,712
February	Quicklime	601	5,384	75,561	81,546
	Hydrate	2,435	7,238[2]	19,715	29,388
	Totals	3,036	12,622	95,276	110,934
March	Quicklime	2,541	9,538	85,918	97,997
	Hydrate	9,695	10,570[2]	24,152	44,417
	Totals	12,236	20,108	110,070	142,414
April	Quicklime	5,945	12,531	75,187	93,663
	Hydrate	26,990	14,476[2]	20,722	62,188
	Totals	32,935	27,007	95,909	155,851
May	Quicklime	5,184	11,569	86,807	103,560
	Hydrate	26,392	14,560[2]	22,503	63,455
	Totals	31,576	26,129	109,310	167,015
June	Quicklime	1,555	11,314	71,170	84,039
	Hydrate	12,444	14,694	23,359	50,497
	Totals	13,999	26,008	94,529	134,536
July	Quicklime	855	10,422	63,713	74,990
	Hydrate	7,296	13,804	20,895	41,995
	Totals	8,151	24,226	84,608	116,985
August	Quicklime	4,683	12,151	63,809	80,643
	Hydrate	14,111	14,267	19,729	48,107
	Totals	18,794	26,418	83,538	128,750

[1] Do not include the following miscellaneous lime: January, 725 tons; February, 572 tons; March, 1,285 tons; April, 3,136 tons; May, 3,595 tons; June, 2,915 tons; July, 2,275 tons; August, 4,075 tons.
[2] Does not include finishing lime.

Table II.—SHIPMENTS OF LIME IN AUGUST, 1934, BY KINDS AND USES

Kinds[1]	Agriculture		Building[2]		Chemical		Totals	
	Tons	Per Ton	Tons	Per Ton	Tons	Per Ton	Tons	Per Ton
Quicklime:								
In bulk	2,131	$5.16	4,249	$7.97	58,916	$6.13	65,296	$6.22
In barrels	127	18.01	4,128	16.88	920	14.51	5,175	16.49
In bags	2,425	9.07	3,774	12.51	3,973	8.88	10,172	10.27
Hydrate	14,111	8.58	14,267	9.13	19,729	8.83	48,107	8.64
Totals or averages	18,794	8.32	26,418	10.64	83,538	6.88	128,750	7.86

[1] Do not include 4,075 tons of miscellaneous lime. [2] Does not include finishing lime.

Table III.—SHIPMENTS AND VALUE OF LIME AND RATIO OF SHIPMENTS TO CAPACITY IN 1933 AND 1934, BY MONTHS

Month	Total Capacity of Concerns Reporting[1] (*tons*)	Shipments Reported (*tons*)	Average Value Per Ton	Ratio of Shipments to Capacity (*per cent.*)												
				United States	Districts											
					1	2	3	4	5B	6-8-9	7	10-11	12	13	14	15
1933																
October	347,446	109,818	$6.84	31.6	15.6	26.1	48.6	32.5	26.1	20.9	46.6	35.5	29.7	21.8	38.2	17.9
November	392,947	100,596	7.01	25.6	15.1	20.0	32.0	22.3	24.2	18.5	37.6	34.4	22.2	26.3	23.2	18.4
December	390,553	107,860	6.72	27.6	17.7	16.3	40.0	21.1	27.9	15.2	41.1	33.8	25.9	22.9	20.3	19.6
1934																
January	392,636	112,437	7.31	28.6	12.2	19.4	39.6	26.3	33.0	23.8	38.1	43.0	36.1	23.4	17.4	17.1
February	406,215	111,506	7.17	27.4	9.7	19.3	35.7	25.5	38.4	18.3	35.9	37.2	42.9	25.5	26.2	18.5
March	392,806	143,699	7.50	36.5	15.5	35.1	47.8	40.4	31.7	25.3	48.2	40.3	49.4	24.7	52.4	26.4
April	391,860	158,987	7.66	40.5	24.4	55.4	53.0	50.7	38.9	29.2	43.7	39.1	44.9	26.5	24.8	20.4
May	397,365	170,610	7.68	42.9	26.9	53.6	62.8	49.4	37.3	28.7	49.8	46.7	36.8	28.7	25.1	23.0
June	396,174	137,451	7.88	34.6	23.8	32.1	49.0	46.3	30.4	25.5	45.4	32.7	34.1	30.4	31.3	18.6
July	409,330	119,259	7.79	29.1	21.1	25.8	34.8	39.8	25.3	24.1	42.1	30.4	32.3	23.4	22.7	19.4
August	404,429	132,825	7.82	32.8	19.0	41.6	39.5	40.7	30.1	28.6	43.1	32.5	32.0	25.4	24.2	21.1
September																

[1] Idle capacity reported as follows: October, 27,414 tons; November, 18,673 tons; December, 12,679 tons; January, 12,687 tons; February, 14,150 tons; March 7,313 tons; April, 3,564 tons; May, 6,397 tons ; June, 7,152 tons, July 14,937 tons; August 8,699 tons.

Labor Conditions

EMPLOYMENT conditions in the nonmetallic-mineral industries showed a slight decline in September, according to preliminary figures. Detailed data for July have become available since the publication of the last report—PIT AND QUARRY, October, 1934, pp. 49-50—and are presented in the accompanying tables.

Quarrying Industry.—In July the 1,087 establishments reporting employed 34,830 workers, the lowest total number reported since April (Table I). The employment index, 55.6, was the second highest of the year, being only 1.9 per cent. below the high mark —56.6 in June—but 12.3 per cent. above the July, 1933, figure. The August index fell to 54.7—a monthly decline of 1.5 per cent. but a yearly gain of 16.0 per cent.—and the September index, 53.3, was 2.6 per cent. under the August figure but still 1.3 per cent. above September a year ago.

One-week pay-rolls, which were $568,501 for 34,839 workers in July and $580,114 for 36,151 workers in August, fell to $556,778 for 35,569 workers in September (Table I). These comparisons indicate a drop in per-capita weekly earnings from $16.32 in July to $15.65 in September. The pay-roll index was 35.0 in July, 34.0 in August and 32.4 in September, the last figure being 4.8 per cent. below August's but 10.6 per cent. higher than that of September, 1933.

Per-capita weekly earnings in July were $16.32, 3.6 per cent. under those of June, but 9.6 above those of the previous July. As already stated, this figure fell to $15.65 in September. The average number of hours worked per week declined to 34.0 in July, a decrease of 5.0 per cent. for the month and 17.0 per cent. for the year. Average hourly earnings, however, rose slightly from 48.0c. in June to 48.6c. in July, an increase of 1.3 per cent. for the month and 32.4 per cent. for the year.

Nine establishments raised their workers' wage-rates in July, 44 employees being affected (Table II). This is the lowest record of increases since March. In June 10 establishments had increased the wage-rates of 412 workers. No decreases have been reported since December of last year.

In Table III are given comparative data on employment and pay-rolls in 1,053 identical establishments for June and July, 1934. Gains in employment are shown in 15 states, ranging from 0.1 per cent. in Florida to 100.0 per cent. in Montana. Five other states show increases of 10 per cent. or more —Kentucky (11.4 per cent.), Connecticut (25.6), Mississippi (26.8), Utah (26.9), and Colorado (75.0). Losses of more than 20 per cent. were reported in Washington (23.4 per cent.), Arizona (25.0), Oregon (29.4), and Nebraska (42.5).

One-week pay-rolls increased in 17 states, the increases ranging from 0.5 per cent. in Virginia to 235.1 per cent. in Montana. The increases were greater than 10 per cent. in Connecticut (12.5), New Hampshire (16.0), and Utah (30.1). Decreases of 20 per cent. or more are shown for Iowa (26.4), Nebraska (26.0), and Oregon (36.4). Six states showed pay-roll increases despite decreases in employment—Louisiana, Maine, New Hampshire, Tennessee, Virginia and Wash-

Table I.—EMPLOYMENT, PAY-ROLLS AND EARNINGS IN THE QUARRYING AND NONMETALLIC-MINING INDUSTRIES, IN 1933 AND 1934, BY MONTHS

(Gains are shown in bold-faced type, losses in light-faced type)

Month	Establishments Reporting	Employment				Pay-Rolls				Per-Capita Weekly Earnings			Average Hours Worked per Week			Average Hourly Earnings		
		Employees on Pay-Rolls	Index of Employment[1]	Percentage Change From—		Amount of Pay-Rolls (1 week)	Index of Pay-Rolls[1]	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—	
				Preceding Month	Year Ago			Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago
1933																		
September	1,152	35,442	52.6	**1.9**	**.4**	$516,932	29.3	2.0	3.9	$14.59	3.8	4.3	34.4	1.11	.....	42.8c.	7.1	.....
October	1,202	36,894	53.2	**1.1**	**1.5**	566,803	31.2	**6.4**	**3.7**	15.36	**5.2**	**2.1**	34.8	**1.4**	.....	44.7c.	**3.5**	.....
November	1,185	34,303	51.1	3.9	**3.4**	497,238	28.3	9.3	**4.4**	14.50	5.5	**.9**	32.5	6.6	.....	45.2c.	**1.1**	.....
December	1,162	30,658	45.3	11.3	**7.1**	434,751	24.4	13.7	**10.4**	14.18	2.7	**3.3**	31.3	3.7	.....	46.1c.	**.9**	.....
1934																		
January	1,144	26,217	39.7	12.5	**13.1**	368,224	21.3	12.6	**17.7**	14.05	.1	**4.1**	30.8	1.9	.....	45.6c.	**.2**	.....
February	1,192	26,561	38.8	2.2	**11.5**	374,577	21.0	1.5	**20.7**	14.10	**.7**	**8.2**	31.1	**1.3**	.....	45.4c.	[2]	.....
March	1,180	28,610	42.0	**8.3**	**19.7**	434,572	24.1	**14.8**	**35.4**	15.19	**5.9**	**13.2**	33.5	**6.3**	2.7	45.6c.	**.7**	**17.7**
April	1,186	32,629	48.7	**15.9**	**23.9**	522,154	29.9	**23.9**	**48.0**	16.00	**6.9**	**19.5**	34.2	**4.0**	4.3	46.9c.	**2.6**	**27.1**
May	1,148	36,111	54.3	**11.4**	**25.1**	615,248	35.0	**17.3**	**47.1**	17.04	**5.3**	**17.7**	36.0	**4.0**	8.0	47.5c.	**.8**	**30.1**
June	1,149	38,250	56.6	**4.4**	**19.7**	648,890	37.0	**5.5**	**34.5**	16.96	**1.1**	**12.6**	35.8	**1.4**	11.9	48.0c.	**.8**	**30.1**
July	1,087	34,830	55.6	1.9	**12.3**	568,501	35.0	5.4	**23.2**	16.32	3.6	**9.6**	34.0	5.0	17.0	48.6c.	**1.3**	**32.4**
August	1,122	36,151	54.7	1.5	**6.0**	580,114	34.0	2.8	**13.7**	.....	.....	.....	.....	.....	.....	.....	.....	.....
September	1,140	35,569	53.3	2.6	**1.3**	556,778	32.4	4.8	**10.6**	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Before March 1, 1934, the index numbers were based on 1926 = 100; since then they have been based on the 3-yr. average, 1923 to 1925, as 100.
[2] No change.

Table II.—CHANGES IN WAGE RATES IN THE QUARRYING AND NONMETALLIC-MINING INDUSTRIES, IN 1933 AND 1934, BY MONTHS

Month Ended	Establishments Reporting	Employees	No Change		Increases		Decreases	
			Establishments	Employees	Establishments	Employees	Establishments	Employees
July 15	1,144	26,217	1,138	26,149	6	68	.....	.....
Aug. 15	1,142	34,553	1,033	29,638	109	4,915	.....	.....
Sep. 15	1,152	35,442	1,059	32,390	93	3,052	.....	.....
Oct. 15	1,202	36,894	1,179	35,305	21	1,516	2	73
Nov. 15	1,185	34,303	1,178	34,132	7	171	.....	.....
Dec. 15	1,162	30,658	1,149	30,431	12	214	1	13
Jan. 15	1,144	26,251	1,138	26,149	6	68	.....	.....
Feb. 15	1,192	26,561	1,189	26,536	3	25	.....	.....
Mar. 15	1,180	28,610	1,179	28,550	1	60	.....	.....
Apr. 15	1,186	32,629	1,166	31,007	20	1,622	.....	.....
May 15	1,148	36,111	1,123	33,616	25	2,495	.....	.....
June 15	1,149	38,250	1,139	37,838	10	412	.....	.....
July 15	1,087	34,830	1,078	34,786	9	44	.....	.....

Table V.—CHANGES IN WAGE RATES IN THE CEMENT INDUSTRY, IN 1933 AND 1934, BY MONTHS

Month Ended	Establishments Reporting	Number of Employees	No Change		Increases		Decreases	
			Establishments	Employees	Establishments	Employees	Establishments	Employees
July 15	122	16,072	108	13,482	14	2,590	.....	.....
Aug. 15	111	15,787	60	5,081	51	10,706	.....	.....
Sep. 15	129	15,545	126	15,451	3	94	.....	.....
Oct. 15	131	13,199	128	12,609	3	510	.....	.....
Nov. 15	113	10,071	113	10,071	.....	.....	.....	.....
Dec. 15	129	10,851	129	10,851	.....	.....	.....	.....
Jan. 15	121	9,495	121	9,495	.....	.....	.....	.....
Feb. 15	125	12,745	125	12,745	.....	.....	.....	.....
Mar. 15	120	13,023	120	13,023	.....	.....	.....	.....
Apr. 15	119	12,414	96	7,694	23	4,720	.....	.....
May 15	122	17,593	115	16,372	7	1,221	.....	.....
June 15	131	19,495	119	17,259	12	2,200	.....	.....
July 15	129	19,158	127	19,026	2	132	.....	.....

ington. In only four states—Florida, Kentucky, Massachusetts and Michigan—were there decreases in pay-rolls and increases in employment.

Cement Industry.—Employment in the cement industry in September fell to 16,799 workers for 122 establishments as compared with 16,920 for 123 plants in August (Table IV). The employment index fell from 55.0 to 54.0, a loss of 1.8 per cent. for the month but a gain of 12.5 per cent. for the year.

One-week pay-rolls, which were $323,831 in August, dropped to $320,082 in September. The pay-roll index dropped from 35.4 to 33.9, a decline of 4.2 per cent. in the month, but a gain of 31.4 per cent. compared with September, 1933. These are the lowest employment and pay-roll index numbers since April.

In July, the latest month for which detailed figures are available, per-capita weekly earnings declined to $20.20, the second highest figure in more than a year. The decrease for the month was 0.8 per cent. and the increase for the year 20.7 per cent. The average number of hours worked, 34.7, showed declines in both comparisons, however—2.3 per cent. for the month and 8.7 per cent. for the year.

Average hourly earnings in July reached 57.1c., the highest point in more than a year. This represents a gain of 0.7 per cent. over June and 35.4 over July of 1933.

Increases in wage-rates continued in July (Table V). Two plants raised the rates affecting 132 workers.

Table III.—COMPARISON OF EMPLOYMENT AND PAY-ROLLS IN IDENTICAL QUARRY AND NONMETALLIC-MINING ESTABLISHMENTS, IN JUNE AND JULY, 1934, BY STATES

(Gains are shown in bold-faced type, losses in light-faced type)

State	Number of Establishments	Number on Pay-Roll, July, 1934	Percentage Change from June, 1934	Amount of Pay-Roll (1 week) July, 1934	Percentage Change from June, 1934
Alabama	10	544	2.5	$6,349	5.0
Arizona	3	30	25.0	503	14.7
Arkansas	4	124	(1)	1,522	**9.1**
California	37	1,018	5.3	19,239	14.3
Colorado	4	49	**75.0**	489	**.6**
Connecticut	25	358	**25.6**	6,501	**12.5**
Delaware					
Dist. of Columbia					
Florida	16	899	**.1**	10,934	**.6**
Georgia	23	1,201	**2.2**	12,448	**8.1**
Idaho					
Illinois	17	562	4.9	10,331	14.9
Indiana	67	1,936	**3.5**	33,126	**3.1**
Iowa	23	353	8.3	5,220	26.4
Kansas	36	1,337	1.8	25,727	10.1
Kentucky	40	1,300	**11.4**	13,423	4.3
Louisiana	7	721	1.5	9,859	**6.3**
Maine	10	468	2.5	11,293	**5.3**
Maryland	9	251	10.0	3,575	16.6
Massachusetts	16	385	**4.6**	8,055	.1
Michigan	41	1,600	**1.2**	29,410	(2)
Minnesota	21	286	**2.5**	4,358	**3.4**
Mississippi	8	199	**26.8**	1,597	18.4
Missouri	48	980	17.9	14,422	13.2
Montana	6	134	**100.0**	3,508	**235.1**
Nebraska	9	235	42.5	3,707	26.0
Nevada					
New Hampshire	10	308	.3	8,501	**16.0**
New Jersey	33	705	**9.6**	13,365	**9.6**
New Mexico					
New York	82	2,784	3.2	54,953	11.5
North Carolina	13	358	**5.6**	4,876	**5.2**
North Dakota					
Ohio	135	3,788	.2	61,985	7.1
Oklahoma	16	175	11.6	1,647	19.0
Oregon	4	72	29.4	1,165	36.4
Pennsylvania	147	5,671	1.3	88,505	13.1
Rhode Island					
South Carolina	4	125	**4.2**	1,429	**3.7**
South Dakota	6	79	3.7	1,072	15.9
Tennessee	24	759	3.1	9,320	**6.1**
Texas	21	1,376	10.9	23,638	4.3
Utah	5	85	**26.9**	1,658	**30.1**
Vermont	37	1,981	5.8	39,765	2.3
Virginia	30	1,078	10.2	14,664	**.5**
Washington	14	333	23.4	7,744	**2.4**
West Virginia	19	935	8.5	12,643	15.7
Wisconsin	14	342	11.4	5,386	9.1
Wyoming					
Totals	1,053	35,924		587,912	

[1] No Change. [2] Less than 1/10 of 1 per cent. loss.

Von Schrenk Chosen To Head Testing Engineers

Dr. Hermann von Schrenk, consulting timber engineer, St. Louis, Mo., and senior vice-president of the American Society for Testing Materials, was elected to the office of President on October 9. This action was taken by the Executive Committee to fill the vacancy caused by the death of W. H. Bassett who passed away on July 21 soon after he took office as head of the society.

The vacancy created by Doctor von Schrenk's election was filled by the appointment of H. S. Vassar, as senior vice-president, Mr. Vassar having been elected a vice-president last June.

A. C. Fieldner, chief engineer, experiment Stations Division, U. S. Bureau of Mines, Washington, D. C., has been elected junior vice-president.

Table IV.—EMPLOYMENT, PAY-ROLLS AND EARNINGS IN THE CEMENT INDUSTRY, IN 1933 AND 1934, BY MONTHS

(Gains are shown in bold-faced type, losses in light-faced type)

Month	Establishments Reporting	Employment				Pay-Rolls				Per-Capita Weekly Earnings			Average Hours Worked per Week			Average Hourly Earnings		
		Employees on Pay-Rolls	Index of Employment[1]	Percentage Change From—		Amount of Pay-Rolls (1 week)	Index of Pay-Rolls[1]	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—	
				Preceding Month	Year Ago			Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago
1933																		
September	129	15,545	44.0	9.7	**5.0**	$256,836	23.9	19.0	2.4	$16.52	10.4	7.3	31.8	11.6	.....	52.2c.	**3.9**	.....
October	131	13,119	38.0	13.7	11.4	240,984	22.9	4.5	9.1	18.37	**10.7**	**2.1**	34.5	**8.4**	.....	54.3c.	**4.0**	.....
November	113	10,071	37.8	.4	7.8	177,760	21.2	7.1	8.6	17.65	6.7	.8	32.0	7.2	.....	52.8c.	2.7	.....
December	129	10,851	33.6	11.3	**2.1**	172,067	17.6	17.1	**2.3**	15.86	6.6	.2	28.5	10.9	.....	54.2c.	**2.6**	.....
1934																		
January	121	9,495	32.6	2.8	**8.7**	164,507	17.9	**1.7**	**19.3**	17.33	**4.6**	**9.3**	31.4	**7.9**	.....	55.7c.	1.1	.....
February	125	12,745	37.6	**15.2**	**26.6**	212,111	20.8	**16.2**	**39.6**	16.64	**.8**	**10.2**	30.8	**4.1**	.....	53.1c.	1.7	.....
March	120	13,023	42.4	**3.4**	**30.1**	224,218	24.1	**7.0**	**46.1**	17.22	**3.5**	**11.7**	31.9	**4.6**	10.6	53.6c.	**.2**	**29.9**
April	119	12,414	48.0	**13.3**	**24.0**	245,774	30.6	**27.0**	**65.4**	19.80	**12.1**	**33.3**	35.3	**7.6**	**3.6**	55.5c.	**3.7**	**33.3**
May	122	17,593	57.6	**20.0**	**42.2**	332,867	35.8	**17.1**	**68.1**	18.92	2.4	**18.3**	33.2	3.5	13.0	56.8c.	**2.2**	**39.0**
June	131	19,459	59.1	**2.6**	**27.1**	395,590	39.9	**11.4**	**57.7**	20.33	**8.5**	**23.9**	35.6	**8.9**	8.0	56.4c.	.9	**39.1**
July	129	19,158	58.4	1.2	**16.3**	387,041	39.1	1.9	**40.6**	20.20	.8	**20.7**	34.7	2.3	8.7	57.1c.	**.7**	**35.4**
August	123	16,920	55.0	5.8	**12.7**	323,831	35.4	9.4	**20.0**	.....	.....	.....	.....	.....	.....	.....	.....	.....
September	122	16,799	54.0	1.8	**12.5**	320,082	33.9	4.2	**31.4**	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Before March 1, 1934, the index numbers are based on 1926 = 100; since then they have been based on the 3-yr. average, 1923 to 1925, as 100.

Foreign Developments

Suggests Lime-Trass Mix for Bedding Brick

Dr. Karl Biehl in *Tonindustrie-Zeitung* for Oct. 26 (57:1016-1017) suggests the possibility of using a lime-trass mixture for making a mortar to bed paving brick. The suggestion is made principally because such a material is being used successfully in the Rhineland for bedding paving blocks. The trass and lime are mixed at the factory, and on the job are mixed with sand and laid dry on the roadbed. After the blocks are laid water is poured over the road, and the blocks are tamped to force the mortar up between the joints. Usually more of the mortar is laid on the surface and swept into the joints with a broom. The trass-lime mixture is said to be slow-setting and not to be disturbed by vibration as is ordinary lime or cement mortar, and the roads or streets so paved are put into service at once.

Senegal Lime Operation Began with World War

During the World War, while communications were hampered or shut off between France and French East Africa, the colony set out to provide some of its necessities that it had been getting from Europe. At that time the burning of lime was begun near Rufisque in Senegal, and the operations have been continued on a small scale since, using oval-section shaft kilns. The operations have been quite empirical, and several investigations that may lead to the installation of a modern plant have been made.

George Negre, who helped make the surveys of the deposit and its commercial possibilities, discusses the project in *Mines, Carrieres, Grandes Entreprises* for September (v. 12, No. 131, pp. 17-24). The materials are essentially marl and limestone, particularly adapted for making hydraulic lime (more used in the colony than ordinary lime) and cement.

Studies Swelling and Shrinkage of Mortars

In a study of the swelling and shrinkage of cement mortars produced from various cements—the swelling in water storage and the shrinkage in combined storage or storage in air—which Dr. O. Goffin and G. Mussgnug report in *Zement* 22:549-556, Oct. 5, these phenomena were found to be notably influenced by the content of free lime, the fineness of grinding, and the admixture of gypsum and calcium chloride. When the free CaO content increases a pronounced swelling results; the shrinkage of such clinkers. however, is slight. Finely-ground cements have a greater shrinkage than coarsely-ground cements. Gypsum, when admixed in quantities over 4 per cent., brings about an increase in the swelling and a slight increase in the shrinkage. Calcium-chloride admixture increases the shrinkage, but has only a slight effect on the swelling. The silica content of the clinker and the S-ratio have no considerable influence on either the swelling or shrinkage of the cement.

Explains Effect of Long Grinding Period

K. Koyanagi, Tokyo, recalls in a current article in *Zement* (22:371-374, July 6, 1933) that in 1931 he published in the same journal the results of studies showing that a long grinding period makes a cement rapid-setting. This phenomenon has recently been explained by Paul Schachtschabel as being caused by the dehydration of the gypsum. This explanation Koyanagi rejects because of the possibility of using even dead-burned gypsum as a cement retarder.

Koyanagi observed that cements ground unusually long always contain some quantity of flat particles that are retained in the sieve analyses. Their number increases with the period of grinding or the size of the grinding balls, and as they increase the setting time of the cement accelerates. Chemical analysis shows they are very high in SO_3. From these and other observations Koyanagi concludes that unusually long periods of grinding concentrate the gypsum inside these flat particles where they are slow in going into solution, and the cement sets rapidly for mere lack of gypsum in the gaging water.

Mortars Made Stronger But Unsound in Sulphur

Following American investigations reported in 1926 by Kobbe and by Bates, Dr. Georg Saenger has made a study of the effect of impregnating surfaces with elemental sulphur, although the American investigations were on concrete and Saenger's are on mortar surfaces on account of the lower expense of the tests. The investigation and its results are reported in *Zement* 22:537-541 and 566-570, Sept. 28 and Oct. 12.

In contrast to the American findings with concrete, Saenger found that mortars (except very lean mixes) are very slowly impregnated, the penetration after 1 hr. in a molten-sulphur bath at 130 to 150 deg. C., with a dry fat mortar, being only about 1 mm. The penetration is somewhat accelerated, if the mortar is put in a bath of sulphur at first at 160 to 170 deg. and then at 125 to 130 deg. Blast-furnaces and Portland cements behaved in about the same way in this regard.

Saenger found, as did the Americans, a considerable increase in the strength properties of the impregnated specimens, the increase in comparative strength in most cases being several times the figure of the strength of the specimen without impregnation. Lean mortars so treated sometimes were higher in compressive strength than were the impregnated fat mortars. With mortars so treated the compressive strength is almost independent of the stiffness of the mortar.

Abrasion by rubbing is considerably reduced by the impregnation. Destruction of the mortar by corrosive chemical agencies is not prevented, but is retarded. In the case of the blast-furnace cements investigated, none were found adapted to the impregnation, because they lost strength in air storage, and were destroyed on contact with water. It should be noted, however, that the blast-furnace cements employed were particularly high in lime and low in alumina. In the case of the Portland cements, there was no evidence of unsoundness when stored in air and in the open, but specimens stored in water were cracked after two years' storage. It is assumed that there would be some evidences of disruption in the specimens stored in air, if the period of observation were longer.

It is concluded that impregnation with elemental sulphur is not suited for construction work in concrete exposed to moisture and weathering. Whether it is suitable in the case of concrete protected against moisture and weathering must be determined by tests covering a longer period of time.

As a service to its readers PIT AND QUARRY *is prepared to supply, at the actual cost of labor and materials, an English translation of any paper abstracted in this magazine. In the case of illustrated papers or articles photostatic reproductions of the illustrations will accompany the translations. Prices will be quoted on request.*

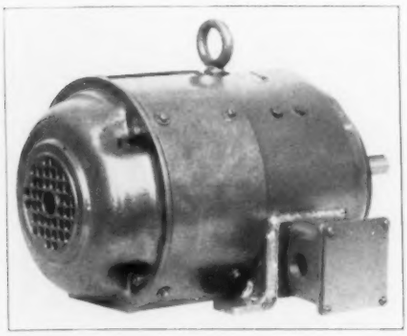
Chain-Belt Co. Appoints California Distributors

The Chain Belt Co., Milwaukee, Wis., announces the appointment of the Jenison Machinery Co., 20th and Tennessee Streets, San Francisco, Cal., as distributor for the northern portion of that state.

New Machinery and Supplies

General Electric Introduces Direct-Current Motor Line

A new line of direct-current motors, designed for those applications where dust, dirt, moisture, or other foreign matter is present in large quantities, has been introduced by the General Electric Co., Schenectady, N. Y. The new motors are totally enclosed and fan-cooled, and are available



Enclosed fan-cooled direct-current motor designed for severe conditions.

in a wide variety of electrical and mechanical modifications, in sizes from ½ to 200 hp.

A system of dual ventilation is utilized. This, together with water-tight conduit boxes, and labyrinth seals at the cartridge-type bearing housings effectively protects the working parts of the motor. An internal fan draws the warm air from the windings and core and circulates it around the totally enclosed interior of the motor so that it gives up its heat to the frame and end shields. An external fan draws cool air in through mesh openings in an outer end shield and directs it over the surface of the magnet frame and inner end shields. Close clearances between the end shields and the bearing housings, and grease seals along the shaft, prevent foreign particles from entering into the motor.

These new direct-current motors are said to be especially suited for application in locations where obnoxious process-dusts prevail, and to such apparatus as stokers, conveyors, pumps, machine tools, sand screens and shakers. They are suitable, too, for outdoor use in mild climates.

In addition to total enclosure, these fan-cooled motors are said to offer, as compared with totally-enclosed motors, a saving in space, greater output per pound of material, economy of operation, and interchangeability with most open motors of corresponding ratings.

New Controlled Insulating Fire Brick is Highly Porous

The A. P. Green Fire Brick Co., Mexico, Mo., announces the new G-25 controlled insulating fire brick, a highly porous brick with innumerable non-communicating cells similar to diatomaceous brick. Its characteristics include a density of 42 lb. per cu. ft., cold crushing strength of 220 lb. per sq. in., transverse crushing strength of 170 lb. per sq. in., a low thermal conductivity, etc. It is also claimed by the manufacturer to show no apparent spalling under the A. S. T. M. panel spalling test and no deformation under the hot load panel test. G-25 is also said to be extremely light in weight (2½ lb.).

The above qualities of this brick are said to bring furnaces up to temperatures in much less time, to reduce heat losses through furnace walls, and to cut fuel costs as much as 50 per cent. They are recommended for use in oil, gas and electric fired furnaces for temperatures up to 2500 deg. F., where slagging or severe abrasion is not encountered. G-3 Mortar and G-3 Coating Mortar are recommended for installing this brick.

New Electric Wire Insulation is Derived Direct from Latex

The United States Rubber Co., New York, N. Y., announces Laytex, a new insulation for electric wire, which is derived directly from latex through a patented process which is said to remove all proteins, sugars and water solubles. This new product is said to possess a high degree of flexibility, great tensile strength and resistance to compression, high dielectric strength and insulation resistance. These features are said to allow the use of thinner walls resulting in finished conductors lighter in weight and smaller in bulk.

New All-Purpose Screen Combines Several Motions

The Beardsley & Piper Co., 2541 N. Keeler Ave., Chicago, Ill., announces a new all-purpose screen, known as the Gyratory screen. These screens operate with a combination of circular, vertical, oblique and forward and backward movement, best described as gyratory. Other features claimed are: no vibration is imparted to the adjacent superstructure; minimum headroom, length and width is required; operating mechanism is dust dealed; screens are easily and quickly changed; minimum of moving parts and low power requirements. Gyratory screens are made in types to meet every application and in sizes of 70 tons per hr. and over.

Screen which combines circular, vertical, oblique and horizontal motions.

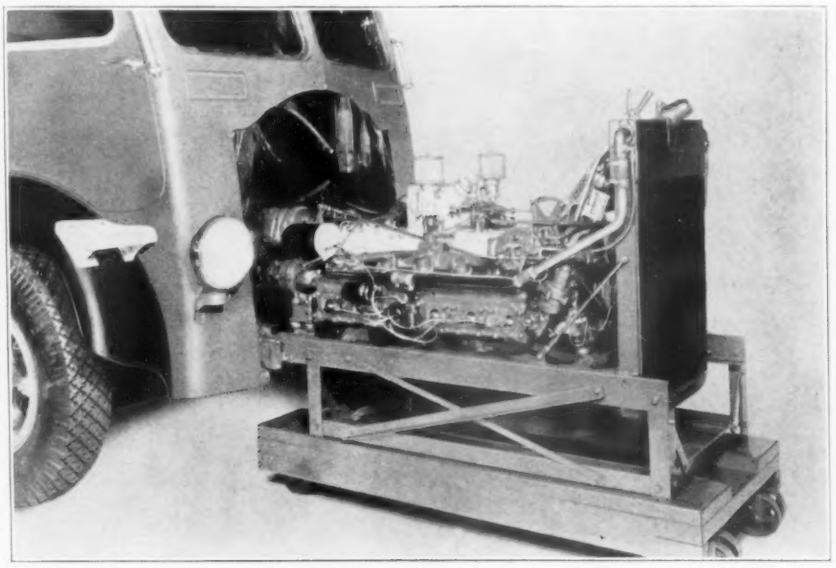
Respirator Features Two Filter Chambers and Comfort

H. S. Cover, 19 Chippewa Ave., South Bend, Ind., announces the new Dupor respirator which is said to be two respirators in one. This respirator is equipped with a face cloth which is comfortable and is also said to force a close contact around different-shaped noses. A new bulb exhalation valve is used which is simple and costs little to replace if destroyed. This respirator has two filter chambers, is foldable and reversible, and is light in weight. Greater efficiency and comfort are claimed because of the large clear filter area.

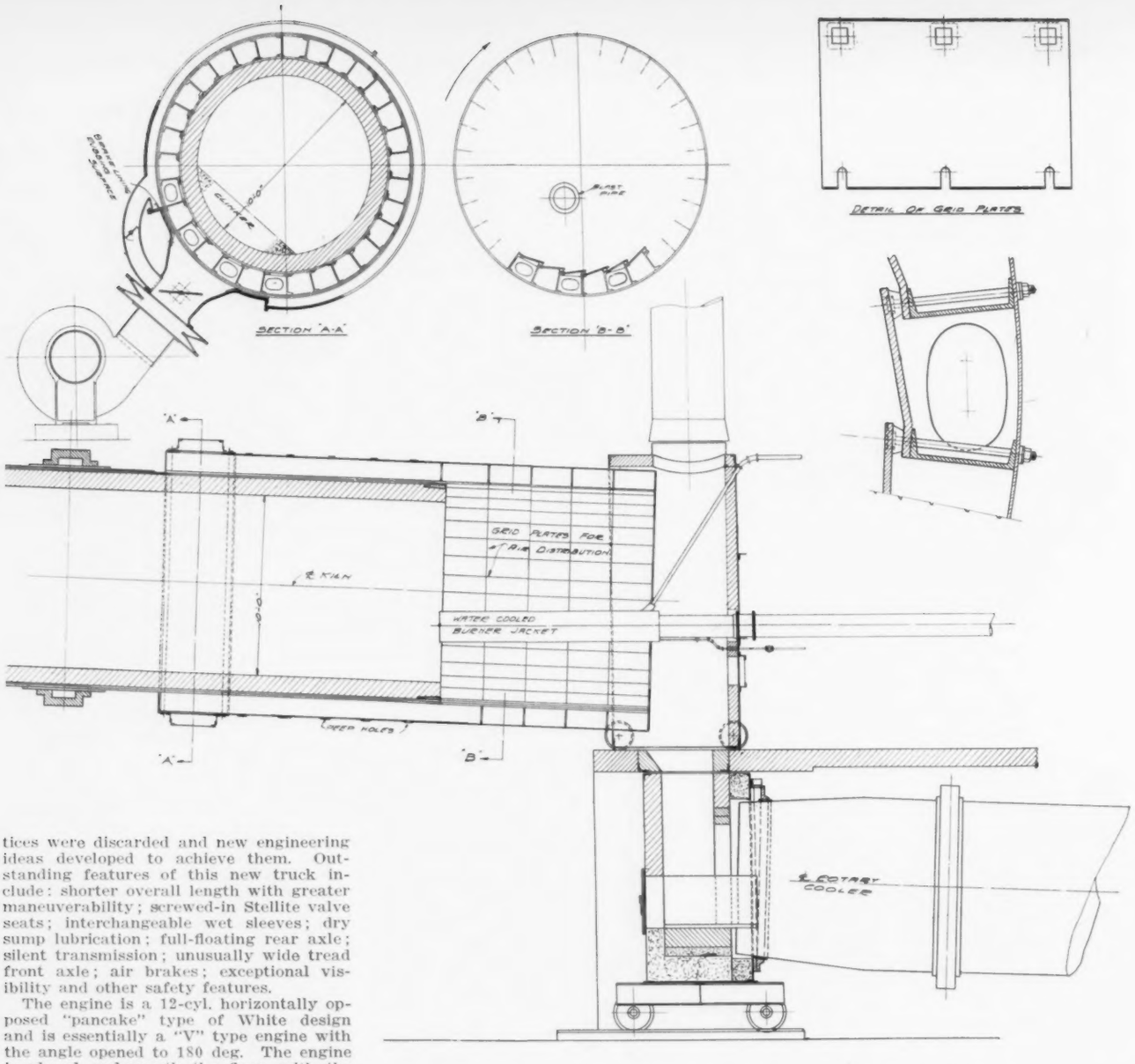
Respirator with two filter chambers.

Underslung Power is Found in White Heavy-Duty Trucks

The White Motor Co., Cleveland, O., announces an ultra-modern motor truck with "Underslung Power" for heavy duty service. It is said that these trucks represent an entirely new principle in heavy-duty hauling and that all conventional prac-



The 12-cyl., horizontally-opposed motor being removed from "ultra-modern" motor trucks which also features balanced weight.



New recuperator attached to feed end of rotary kiln. Above are cross-sections of recuperator and details of grid plates.

tices were discarded and new engineering ideas developed to achieve them. Outstanding features of this new truck include: shorter overall length with greater maneuverability; screwed-in Stellite valve seats; interchangeable wet sleeves; dry sump lubrication; full-floating rear axle; silent transmission; unusually wide tread front axle; air brakes; exceptional visibility and other safety features.

The engine is a 12-cyl. horizontally opposed "pancake" type of White design and is essentially a "V" type engine with the angle opened to 180 deg. The engine is placed underneath the floor, with the cab moved forward to the extreme front end of the truck. This power plant arrangement is said to give better weight distribution, lower center of gravity and greater payload space. The valves are on the underside of the engine at the lowest point of the cooling system. The fan is beltless and is driven directly off the end of the crankshaft. The engine is accessible through the floor boards of the cab and can be quickly removed on a dolly.

This new truck is available for all types of hauling including delivery and dump truck operations. It is available in 24,000 to 30,000 lb. gross-weight trucks and tractor-trailer units and six-wheels for heavier loads. Wheelbases range from 108 to 180 in.

Recuperator Utilizes Heated Air from Feed End of Kiln

Great progress has been made in recent years in reducing the cost of manufacturing cement and in these days, anything that will improve the quality of the product or reduce the cost of manufacture is of great interest to the cement industry. All mill operators as well as the owners of plants have been aware of the fact that the rotary kiln as a heat-utilizing machine is inefficient.

Advances have been made in using the hot gases from the feed end of the kilns and more recently more attention is being paid to the front, or firing, end of the kilns. In boiler and furnace practice preheated air has been successfully used for a number of years. Lately these lines have been followed in the cement industry and the principle is utilized in the Buckbee air preheater and clinker cooler as manufactured and installed by the Springfield Boiler Co. of Springfield, Ill. A patent (No. 1,800,741) covering this unit was issued to J. C. Buckbee, its inventor, July 15, 1932.

By referring to the illustration it will be seen that a fan located on the floor furnishes air under pressure to a stationary steel duct extending around the kiln. The front end of the kiln is replaced by a new air-preheating section which is composed of a series of tuyere plates fastened to channel irons which are welded to the kiln shell and extend back to the fan duct. Around the channels is a steel shell, also extending from the end of the kiln to the stationary steel air-duct. There are openings in this outer steel shell under the stationary air-duct and, as the kiln revolves, the air is forced through these chambers formed by the channel irons and the outer shell to the front tuyere section.

By referring to the large section of the tuyere plates it will be seen that there is a 1-in. opening underneath each of the plates, and the air is forced through these openings into the kiln. In the sections A-A and B-B, it will be seen that the greatest amount of the air is forced through the bed of hot clinker, and a much smaller part goes to the chambers extending from the air-duct to the air-preheating section. Section A-A shows the dampers which control the air-supply, and section B-B shows how the air is introduced into the air-preheating section. By controlling the amount of air introduced into the preheating section the clinker can be cooled to any desired temperature within reason. On the top of the front hood is installed a stack, which controls, by means of a damper, the surplus air that is not required for combustion. Connected to this stack is a hot-air intake duct, with a temperature-controlling damper, for primary air for the coal-injector blower. The injector blast-pipe extends into the kiln to about the end of the tuyere plates and is water-cooled to the desired extent.

It is estimated that the air would be preheated to about 1,000 deg. F. and the clinker would be cooled to 800 deg. to 1,000 deg. or lower if desired, depending on the amount of air supplied by the fan.

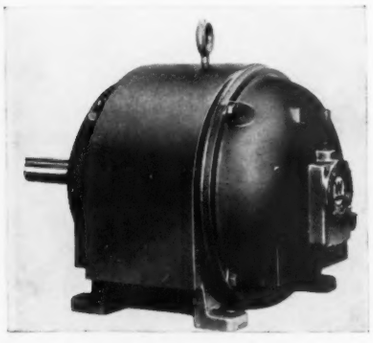
After the clinker has left the air-preheating section of the kiln, it drops into

the ordinary rotary clinker cooler where the remainder of the cooling is completed. The outer shell is provided with numerous peep holes, closed with mica, which allows inspection of the kiln shell for the discovery of the hot spots. The tuyere plates are made of heat-resisting steel and the first two rows of plates may be faced with high-temperature refactories. The tuyere plates are very simple in form and, can be replaced with very little trouble or expense.

The design is very simple and an installation can be made at small expense as very little change is required in the arrangement of present equipment. The Springfield Boiler Co. has arranged to manufacture and install this equipment, and W. J. Williams, 111 West Monroe Street, Chicago, Ill., who was formerly Chicago sales manager of the Edge Moor Iron Co. for whom he installed a great many waste-heat units in cement plants, is marketing the cooler.

Splash-Proof Motor Requires No Additional Protection

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a new splash-proof, drip-proof and weather-proof motor for use indoors or outdoors or for any applications where drippings or splashing liquids are encountered. This motor is said to be entirely new in that it is not an adaptation of an open machine with enclosures applied around the frame, but it has been built with the motor frame and end brackets of solid castings for this special class of service. The case iron being of thick cross section and inherently resistant to rust and corrosion,



Splash-proof motor with motor frame and end brackets cast solid.

makes this motor highly resistant to gases. Even the conduit box is made of cast iron so that there are no exposed sheet steel parts to be attacked by corrosion.

A baffle plate cast integral with the inner side of the motor bracket prevents splashing liquids from reaching the motor windings. In fact, this motor is said to be so well protected that it may be used outdoors the year round without any additional protection.

These motors are offered with either ball or sealed sleeve bearings. The splash proof motors are rated 50 deg. continuous and are offered in both the squirrel cage and wound rotor types.

10 Combinations of Thrust and Stroke in New Thrustor

A number of improvements in the G-E Thrustor, a self-contained combination of motor-driven centrifugal pump, oil chamber, and piston that produces a smooth straight-line thrust through a definite length of stroke especially suitable for the operation of clutches, brakes, valves, doors, etc., have been announced by the General Electric Co., Schenectady, N. Y.

The new line of Thrustors consists of a complete range of standard models providing 10 combinations of thrust and stroke ratings varying from 50 to 3200 lb. thrust and from 2 to 16 in. stroke.

New Thrustor with adjustable thrust and stroke.

In the new Trustor, the impeller housing of the centrifugal pump is stationary, a rigid shaft running in ball bearings connecting the impeller to the driving motor. A number of driving motor arrangements are available—ac. or dc. All motors are totally enclosed (except d-c. and single-phase motors on the 50-lb. size) for protection against dirt and moisture. For single-phase service, capacitor motors are used on all Thrustors rated 100 lb. and greater thrust. For 25-cycle service, a special step-up gear train is provided to obtain the same impeller speed as that produced in 60-cycle service. For 50-cycle supply, impellers of slightly greater diameter are used to maintain rated thrust capacity.

Interchangeable base plates are available for clevis or rigid mounting of the device. Tilting as much as 45 deg. away from the vertical is permissible with the new Thrustors. It is also designed for continuous operation with the piston in the stalled position.

As a smooth acting, straight-line operating device, subject to manual, remote, or fully automatic control, the Thruster is said to be suitable for a wide variety of applications in many fields.

The Bucyrus-Erie Co., South Milwaukee, Wis., announces the appointment of Irving G. King & Co., 767 Stanford Ave., Los Angeles, Cal., as Loadmaster distributor for the Los Angeles territory.

American Hoist & Derrick Firm Makes Promotions

The American Hoist & Derrick Co., Saint Paul, Minn., announces the resignation of Frank J. Johnson as President. Mr. Johnson, with Oliver Crosby, founded the American Mfg. Co. in 1882, manufacturing hand power hoists and derrick equipment, in 1892 reorganizing as the American Hoist & Derrick Co., enlarging their manufacturing facilities and consequently producing a complete line of hoisting and earth moving machinery.

Frederic Crosby, son of Oliver Crosby, succeeds Mr. Johnson. Howard S. Johnson, son of Mr. Frank J. Johnson, retains his title as vice president, and Harold O. Washburn, formerly Gen. Supt., has been appointed vice president and treasurer to succeed Mr. Crosby.

Productive Equipment Co. Appoints Representatives

Carl Foeller, formerly with the Niagara Roller Bearing Screen Company, has joined W. H. McKee, Inc., 436 Oliver Building, Pittsburgh representatives of the Productive Equipment Corp., Chicago, Ill.

Hyman Ledeen, western representative of the Falk Corp., has been appointed representative covering the states of California, Nevada, Utah, Colorado, Mexico and Arizona, with a main office at 747 Warehouse St., Los Angeles, Calif., and a branch under the name of Otrich & Ledeen, 244 9th St., San Francisco, Calif.

Bonnot Company Appoints New Eastern Distributor

The Bonnot Co., Canton, O., announces the appointment of Brown & Sites Co., Inc., 30 Church St., New York, N. Y., as its representative for the eastern half of New York State, New Jersey, and Connecticut. In the future all sales and development work relating to crushers, pulverizers, grinding equipment, kilns, driers, and cement mill machinery, will be handled through the above office.

Statement of Ownership

PIT AND QUARRY

Statement of the ownership, management, circulation, etc., required by the Act of Congress of March 3, 1933, of PIT AND QUARRY, published bi-weekly at 538 S. Clark Street, Chicago, Ill., for October 1, 1934.

State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared H. W. Baumgartner, who, having been duly sworn according to law, deposes and says that he is the business manager of PIT AND QUARRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, Complete Service Publishing Co.; Editor, S. A. Phillips; Business Manager, H. W. Baumgartner, all of Chicago, Ill.

2. That the owner is Complete Service Publishing Co., Chicago, Ill. That the stockholders owning 1% or more of the total amount of stock are: H. W. Baumgartner and I. A. Baumgartner, both of Chicago, Ill.

3. That there are no bondholders, mortgagees, or other security holders owning or holding 1% or more of total amount of bonds, mortgages or other securities.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

H. W. BAUMGARTNER,
Business Manager.

Sworn to and subscribed before me this 28th day of September, 1934.
(Seal)

MICHAEL MOTTO,
Notary Public.

My commission expires Aug. 2, 1937.

Classified Buyers' Guide

A Directory of Pit and Quarry Advertisers Arranged According to Product

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified, if brought to the attention of the Advertisers' Service Department.

Index to Advertisers on Page 64

Aggregate-Bituminizing Plants
Hetherington & Berner, Inc.

Agitating Ladders (Dredge)
*Eagle Iron Works
Pettibone Mulliken Co.

Air Separators
Gay, Rubert M.
Raymond Bros. Impact Pulv. Co.
Universal Road Machy. Co.

Ash and Refuse-Handling Equipment
Allen-Sherman-Hoff Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Automatic Feeders
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Automatic Weighers
*Bartlett & Snow Co., C. O.

Backfillers
*Austin-Western Road Machy. Co.

Balls (Grinding)
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.

Balls (Tube-Mill, etc.)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Baskets (Dipping)
Buffalo Wire Works Co.

Bearings (Anti-Friction)
*Bartlett & Snow Co., C. O.
Hetherington & Berner, Inc.
*Link-Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Belting
Goodyear Tire & Rubber Co.
Haiss Mfg. Co., Geo.
*Link-Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Belting (Multiple V)
Goodyear Tire & Rubber Co.

Bin Gates
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Bins (Cast Iron)
Allen-Sherman-Hoff Co.

Bins (Steel)
*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
Pioneer Gravel Equipment Mfg. Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Blast-Hole Drills (See Drills—Blast-Hole)

Blasting Machines
Atlas Powder Co.

Blasting Supplies
Atlas Powder Co.
*Ensign-Bickford Co.

Blocks (Sheave)
American Manganese Steel Co.
Haiss Mfg. Co., Geo.
Sprout, Waldron & Co.

Bodies (Motor Truck, Concrete Mixing)
*Bartlett & Snow Co., C. O.

Borings, Core
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Bronze Work (Ornamental)
Buffalo Wire Works Co.
National Wire Cloth Co.
*Tyler Co., W. S.

Bucket Elevators (See Conveyors and Elevators)

Buckets (Clamshell, Orange-Peel, Etc.)
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Link-Belt Co.
Pettibone Mulliken Co.

Buckets (Dragline—Cableway)
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
Pioneer Gravel Equipment Mfg. Co.

Buckets (Elevator and Conveyor)
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pettibone Mulliken Co.
Pioneer Gravel Equipment Mfg. Co.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Bulk-Cement Storage Plants
Sprout, Waldron & Co.

Cableways
*American Steel & Wire Co.
*Link-Belt Co.

Caps (Blasting)
Atlas Powder Co.

Capstans (See Winches and Capstans)

Car Dumpers
*Link-Belt Co.

Car Pullers
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Cars (Quarry and Gravel Pit)
*Austin-Western Road Machy. Co.
Stephens-Adamson Mfg. Co.

Carriers
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Car Wheels — (See Wheels — Car)

Castings
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Eagle Iron Works
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.
*Link-Belt Co.
McLanahan and Stone Corp.
Pettibone Mulliken Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Cement Pumps (See Pumps; Air Pumps; Pumps, Cement Slurry; Pumps, Bulk Cement)

Central Concrete-Mixing Plants (Complete)
*Bartlett & Snow Co., C. O.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Chain Drives
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Chutes and Chute Liners
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Goodyear Tire & Rubber Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Classifiers
Deister Machine Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Clips (Wire Rope)
*American Steel & Wire Co.

Clutches
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Coal-Pulverizing Equipment
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
Gay, Rubert M.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Raymond Bros. Impact Pulv. Co.
Universal Road Machy. Co.

Compressors (See Air Compressors)

Concentrators (Slurry)
*Deister Concentrator Co.

Cones (Sand-Washing)
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Link-Belt Co.
Smith Engr. Works

Conveyor Belting (See Belting)

Conveyor Idlers and Rolls
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Conveyors and Elevators
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
Pioneer Gravel Equipment Mfg. Co.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.
*Universal Crusher Co.
Universal Road Machy. Co.

Conveyors (Ready-Mixed Concrete)
*Bartlett & Snow, Co., C. O.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Coolers (See Kilns and Coolers —Rotary)

Couplings (Flexible and Shaft)
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Cranes (Crawler and Locomotive)
*Austin-Western Road Machy. Co.
*Link-Belt Co.
Ohio Power Shovel Co.

Crusher Parts
American Manganese Steel Co.
*American Pulverizer Co.
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.
McLanahan and Stone Corp.
Pettibone Mulliken Co.

Crushers (Hammer)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
*Dixie Machy. Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Universal Crusher Co.

Crushers (Jaw and Gyratory)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.
Lewistown Foundry & Machinery Co.
Pioneer Gravel Equipment Mfg. Co.
Smith Engr. Works
*Universal Crusher Co.
Universal Road Machy. Co.

Crushers (Ring)
*American Pulverizer Co.
*Bartlett & Snow Co., C. O.

Crushers (Roll)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
Pioneer Gravel Equipment Mfg. Co.

Crushers (Rotary)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.

Crushing Rolls
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.

Detonators
Atlas Powder Co.

Diesel Engines (See Engines—Diesel)

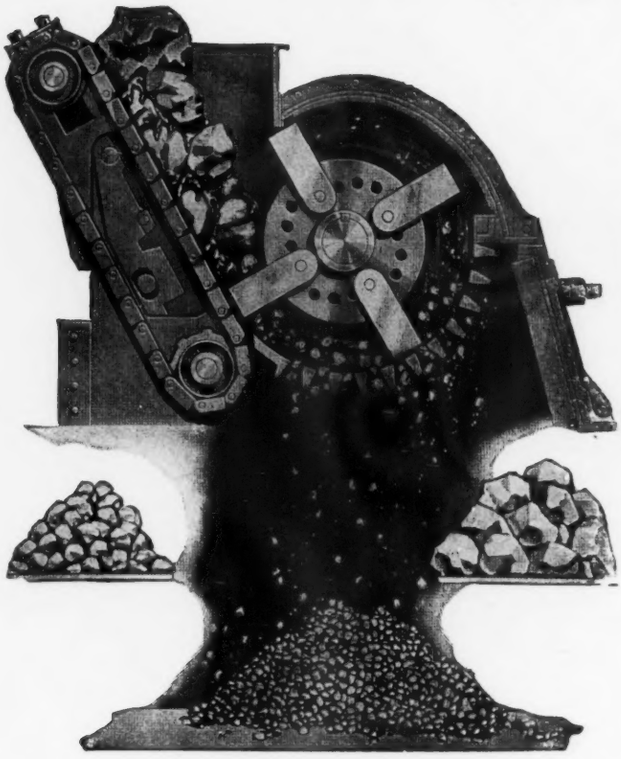
Dippers and Teeth (Power Shovel)
American Manganese Steel Co.
Pettibone Mulliken Co.

Dragline Cableway Excavators
*Link-Belt Co.

Dragline Excavators
*Austin-Western Road Machy. Co.
*Link-Belt Co.
Ohio Power Shovel Co.

*** See also information in the 1934 Pit and Quarry HANDBOOK.**

From the kickoff to the final gun



DIXIE MOGUL

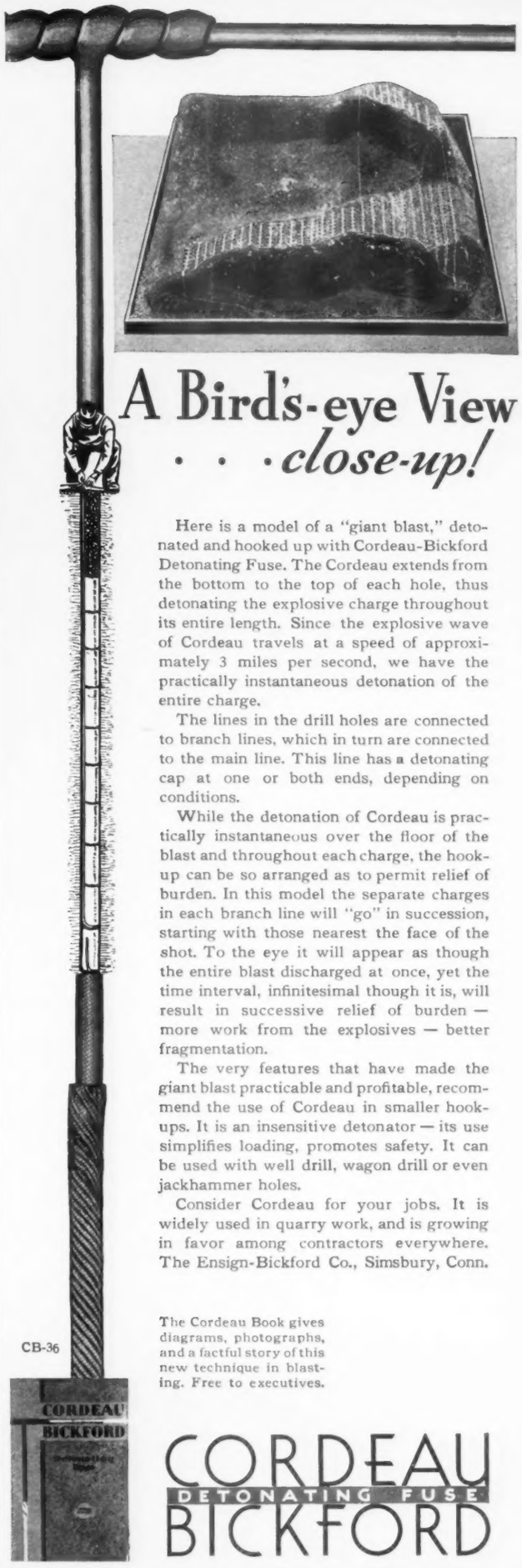
keeps going with never any "time out." It tackles the toughest grind and crushes all opposition, running up a big score for dear old Economy.

The detail parts of the DIXIE are like a smooth working, well balanced team with plenty of "beef" in the line. The special moving breaker plate is typical—twenty-six times the average wearing area. All other parts are equally husky. That is the reason for the non-clog, non-stop operation of the DIXIE MOGUL Hammer Mill under all conditions of service. It is the answer to reduced crushing costs in cement plant or quarry.

There is a DIXIE for every job and every position in the line-up—forty sizes for all capacities and requirements, primary, secondary and fine reduction.

Write for your copy of the new 32-page catalog on modern crushing methods. It will show you the way to large savings.

DIXIE
MACHINERY MFG. CO.
4209 GOODFELLOW AVE., ST. LOUIS, MO.



A Bird's-eye View . . . *close-up!*

Here is a model of a "giant blast," detonated and hooked up with Cordeau-Bickford Detonating Fuse. The Cordeau extends from the bottom to the top of each hole, thus detonating the explosive charge throughout its entire length. Since the explosive wave of Cordeau travels at a speed of approximately 3 miles per second, we have the practically instantaneous detonation of the entire charge.

The lines in the drill holes are connected to branch lines, which in turn are connected to the main line. This line has a detonating cap at one or both ends, depending on conditions.

While the detonation of Cordeau is practically instantaneous over the floor of the blast and throughout each charge, the hookup can be so arranged as to permit relief of burden. In this model the separate charges in each branch line will "go" in succession, starting with those nearest the face of the shot. To the eye it will appear as though the entire blast discharged at once, yet the time interval, infinitesimal though it is, will result in successive relief of burden — more work from the explosives — better fragmentation.

The very features that have made the giant blast practicable and profitable, recommend the use of Cordeau in smaller hookups. It is an insensitive detonator — its use simplifies loading, promotes safety. It can be used with well drill, wagon drill or even jackhammer holes.

Consider Cordeau for your jobs. It is widely used in quarry work, and is growing in favor among contractors everywhere. The Ensign-Bickford Co., Simsbury, Conn.

The Cordeau Book gives diagrams, photographs, and a factful story of this new technique in blasting. Free to executives.

CORDEAU
DETONATING FUSE
BICKFORD

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Index to Advertisers on Page 64

Dredges
Hetherington & Berner, Inc.
*Morris Machine Works

Drilling Contractors
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Core)
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills, Diamond
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Rock)
*Jeffrey Mfg. Co.

Drills (Well) (See Drills—Blast-Hole)

Drives (Multiple, Belt, Chain, Rope)
*Allis-Chalmers Mfg. Co.

Dryers
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.
Lewistown Fdry. & Mch. Co.
McLanahan and Stone Corp.
*Tyler Co., W. S.

Dust-Collecting Systems
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Raymond Bros. Impact Pulv. Co.

Dust Handling Systems (Hydro Vacuum)
Allen-Sherman-Hoff Co.

Dust Hoods and Helmets
Pulmosan Safety Equipment Corp.

Dynamite (See Explosives)

Electrical Equipment
*Allis-Chalmers Mfg. Co.

Elevator Belting (See Belting)

Elevators (See Conveyors and Elevators)

Engineers
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Engine Generator Sets
See Generator Sets (Engine).

Engines (Steam)
*Morris Machine Works

Excavating Machinery (See Shovels; Cranes; Buckets; etc.)

Excavators—Shallow Grading (Bucket Elevator Type)
Haiss Mfg. Co., Geo.

Explosives
Atlas Powder Co.

Fans (Exhaust)
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Feeders
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Morrow Mfg. Co.
Pioneer Gravel Equipment Mfg. Co.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Fencing (Woven Wire)
*American Steel & Wire Co.
Buffalo Wire Works Co.

Floor Sweeping Systems (Hydro Vacuum)
Allen-Sherman-Hoff Co.

Fuses (Detonating)
Atlas Powder Co.
*Ensign-Bickford Co.

Gaskets
Goodyear Tire & Rubber Co.

Gasoline Engines (See Engines—Internal-Combustion)

Gates (Bin) (See Bin Gates)

Gates (Clamshell)
Haiss Mfg. Co., Geo.
*Link-Belt Co.

Gears (Herringbone)
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Gears and Pinions
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Pettibone Mulliken Co.
Sprout, Waldron & Co.

Gelatin (See Explosives)

Generators (See Motors and Generators)

Glass Sand Equipment
Lewistown Foundry & Machine Co.

Goggles
Pulmosan Safety Equipment Corp.

Grab Buckets (See Buckets—Clamshell, Orange - Peel, etc.)

Grating (Steel)
*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.

Grinding Balls (See Balls, Grinding)

Grizzlies
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Eagle Iron Works
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mach. Co.
Pettibone Mulliken Co.
Smith Engr. Works
Stephens-Adamson Mfg. Co.
Universal Road Machy. Co.

Guards (Wire)
*Bartlett & Snow Co., C. O.
National Wire Cloth Co.

Guns (Hydraulic)
Hetherington & Berner, Inc.

Hammer Mills (See Crushers—Hammer)

Hoists
*Bartlett & Snow Co., C. O.
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pioneer Gravel Equipment Mfg. Co.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Hoppers
*Hendrick Mfg. Co.
*Link-Belt Co.

Hose (Air, Steam and Water)
Goodyear Tire & Rubber Co.

Hose Couplings (See Couplings)

Hydraulic Guns (See Guns—Hydraulic)

Idlers
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Kilns and Coolers (Rotary)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
Bonnot Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.

Lime-Handling Equipment
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Raymond Bros. Impact Pulv. Co.
Stephens-Adamson Mfg. Co.

Lime Kilns
*Bartlett & Snow Co., C. O.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Loaders and Unloaders
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Locomotives (Electric, Gas and Steam)
*Lima Locomotive Works

Locomotives (Trolley-Battery)
*Jeffrey Mfg. Co.

Magnetic Pulleys (See Pulleys, Magnetic)

Manganese Steel
American Manganese Steel Co.
Pettibone Mulliken Co.

Manganese Steel (Plates and Sheets)
American Manganese Steel Co.
Pettibone Mulliken Co.

Mill Liners and Linings
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Mills (Grinding) (See also Crushers—Hammer)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mch. Co.
Raymond Bros. Impact Pulv. Co.
Sprout, Waldron & Co.

Motor Trucks
General Motors Truck Co.

Motors and Generators
*Allis-Chalmers Mfg. Co.

Motors (Internal-Combustion) (See Engines — Internal-Combustion)

Nails
*American Steel & Wire Co.

Netting (Locomotive Stack)
Buffalo Wire Works Co.
*Tyler Co., W. S.

Nozzles (Gravel Washing)
Binks Mfg. Co.
*Deister Concentrator Co.

Nozzles (Hydraulic) (See Guns—Hydraulic)

Nozzles (Spray)
Binks Mfg. Co.
*Deister Concentrator Co.

Packings
Goodyear Tire and Rubber Co.

Partitions (Wire)
Buffalo Wire Works Co.
National Wire Cloth Co.

Pawls
Stephens-Adamson Mfg. Co.

Perforated Metal Plates
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Chicago Perforating Co.
*Hendrick Mfg. Co.
Morrow Mfg. Co.
Sprout, Waldron & Co.

Pipe Flanges
Hetherington & Berner, Inc.

Plug Valves (See Valves)

Pneumatic Drills (See Drills, Rock)

Portable Conveyors
Haiss Mfg. Co., Geo.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Portable Crushing and Screening Plants
*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
Pioneer Gravel Equipment Mfg. Co.
Stephens-Adamson Mfg. Co.
*Universal Crusher Co.

Portable Engines (See Engines—Internal Combustion)

Portable Loaders (See Loaders and Unloaders)

Power Cables (Rubber Clad)
*American Steel & Wire Co.

Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

Pulleys (Magnetic)
Sprout, Waldron & Co.

Pulleys (Wing)
Sprout, Waldron & Co.

Pulverized Fuel Systems
*Bartlett & Snow Co., C. O.
Gay, Rubert M.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Raymond Bros. Impact Pulv. Co.
Universal Road Machy. Co.

Pulverizers (See also Crushers; Mills; etc.)
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Krupp Grusonwerk, Fried.
Lewistown Foundry & Machinery Co.
Raymond Bros. Impact Pulv. Co.
*Universal Crusher Co.

Pump Valves (See Valves Pump)

Pumps (Cement Slurry)
Allen-Sherman-Hoff Co.
*Morris Machine Works

Pumps (Centrifugal)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone Mulliken Co.

Pumps (Dredging)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone Mulliken Co.

Pumps (Sand and Gravel)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone Mulliken Co.

Ready-Mixed Concrete Plants
*Bartlett & Snow Co., C. O.
Stephens-Adamson Mfg. Co.

Respirators
Pulmosan Safety Equipment Corp.

Rock Drills (See Drills—Rock)

Rod Mills
*Kennedy-Van Saun Mfg. and Eng. Corp.

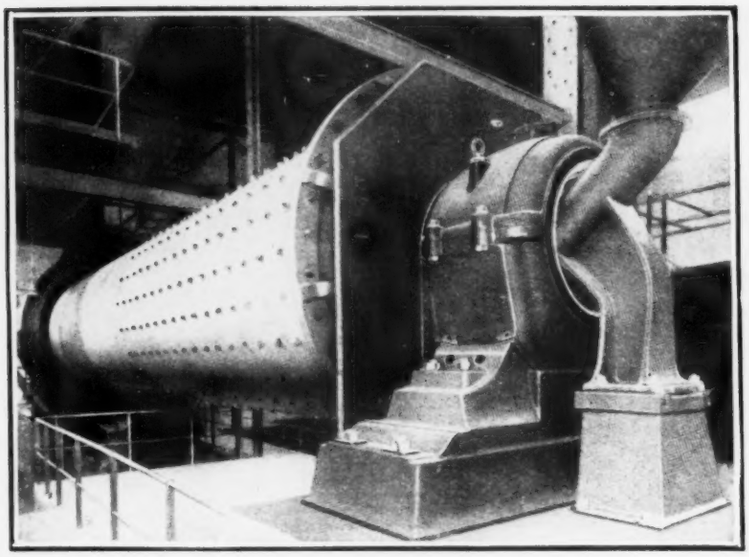
Rope (Wire) (See Wire Rope)

Safety Equipment
Pulmosan Safety Equipment Corp.

*** See also information in the 1934 Pit and Quarry HANDBOOK.**

KRUPP.

Three-Compartment Tube Mill in a Cement Factory



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MANY TYPES

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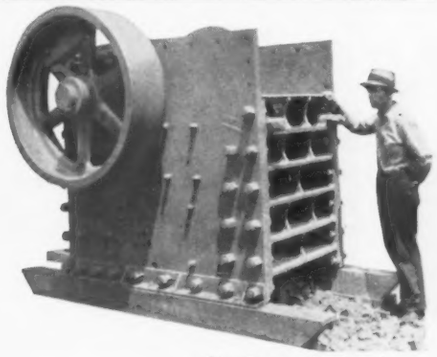

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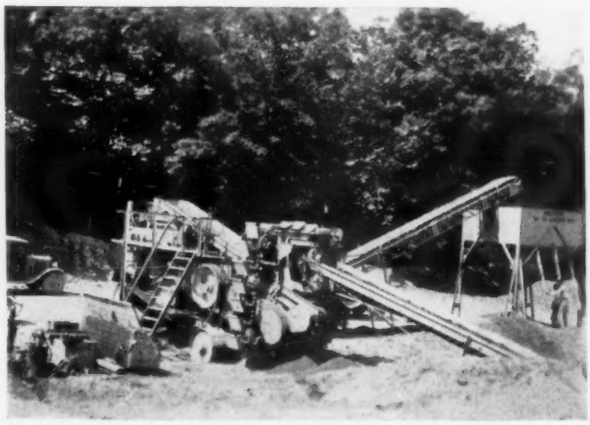

No. 100 Crushing and Screening Plant in operation.

● A wide range of experience in developing stationary and portable crushing, screening and washing plants qualifies the Austin-Western Engineer to give you special service. The knowledge obtained from a study of every type under actual working conditions will prove invaluable in helping you select the most efficient equipment for your particular kind of work.

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Branches in Principal Cities

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Name.....
Address.....
City & State.....

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Index to Advertisers on Page 64

Sand Separators
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pioneer Gravel Equipment Mfg. Co.
Smith Engr. Works
Stephens-Adamson Mfg. Co.

Sand-Settling Tanks
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Pioneer Gravel Equipment Mfg. Co.
Smith Engr. Works
Stephens-Adamson Mfg. Co.

Scrapers (Power Drag)
*Austin-Western Road Machy. Co.
Iowa Mfg. Co.
*Link-Belt Co.
Pioneer Gravel Equipment Mfg. Co.

Screens
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Buffalo Wire Works Co.
Chicago Perforating Co.
*Deister Concentrator Co.
Deister Machine Co.
*Eagle Iron Works
Gay, Rubert M.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
National Wire Cloth Co.
Pioneer Gravel Equipment Mfg. Co.
Productive Equip. Corp.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.
*Tyler Co., W. S.
*Universal Crusher Co.
Universal Road Machy. Co.

Screens (Vibrating or Shaking)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
Buffalo Wire Works Co.
*Deister Concentrator Co.
Deister Machine Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pioneer Gravel Equipment Mfg. Co.
Productive Equip. Corp.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.
*Tyler Co., W. S.
*Universal Crusher Co.

Scrubbers
*Tyler Co., W. S.

Separators (Air) (See Air Separators)

Sheaves
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Eagle Iron Works
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pettibone Mulliken Co.
Sprout, Waldron & Co.

Shovels (Electric, Internal Combustion and Steam)
*Austin-Western Road Machy. Co.
*Link-Belt Co.
Ohio Power Shovel Co.

Skip Hoists and Skips
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Speed Reduction Units
Iowa Mfg. Co.
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Spouts (See Chutes and Chute Liners)

Sprays
Binks Mfg. Co.
*Deister Concentrator Co.

Sprays (Paint)
Binks Mfg. Co.

Sprockets and Chain
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Pettibone Mulliken Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Stackers
*Jeffrey Mfg. Co.

Steel Grating (See Grating, Steel)

Steel Inclines (See Inclines, Steel)

Steel Plate Construction
*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
Sprout, Waldron & Co.

Storage Equipment
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Sweeping Systems
Allen-Sherman-Hoff Co.

Tanks
*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.
*Link-Belt Co.

Tanks (Sand-Settling)
*Bartlett & Snow Co., C. O.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Morrow Mfg. Co.
Pioneer Gravel Equipment Mfg. Co.
Smith Engr. Works
Stephens-Adamson Mfg. Co.

Testing Sieves and Shakers
*Hendrick Mfg. Co.
*Tyler Co., W. S.

Tires (Truck)
Goodyear Tire & Rubber Co.

Tools (Drill) (See Drilling Accessories)

Truck Equipment
Pettibone Mulliken Co.

Tractors
*Allis-Chalmers Mfg. Co.

Trailers
General Motors Truck Co.

Tramways (Aerial)
*American Steel & Wire Co.

Transformers
*Allis-Chalmers Mfg. Co.

Transmission Belting (See Belting)

Transmission Machinery
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulv. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Trippers
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Truck Cranes (See Cranes)

Truck Mixers
*Bartlett & Snow Co., C. O.

Trucks and Trailers (See Motor Trucks)

Tube-Mills (See Mills—Ball, Tube, etc.)

Underground Loaders
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.

Unloaders (Box Car)
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Variable Speed Reducers or Transmissions
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Vibrating Screen Plate
*Bartlett & Snow Co., C. O.
Chicago Perforating Co.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Morrow Mfg. Co.

Vibrating Screens (See Screens—Vibrating)

Vibrators
*Jeffrey Mfg. Co.
*Tyler Co., W. S.

Washers (Sand, Gravel and Stone)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Eagle Iron Works
Haiss Mfg. Co., Geo.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pioneer Gravel Equipment Mfg. Co.
Smith Engr. Works
Stephens-Adamson Mfg. Co.
*Tyler Co., W. S.
Universal Road Machy. Co.

Welding Supplies
American Manganese Steel Co.
*American Steel & Wire Co.

Well Drills (See Drills—Well)

Wheels (Car)
American Manganese Steel Co.
*Eagle Iron Works
Iowa Mfg. Co.
Pettibone Mulliken Co.

Winches and Capstans
*Bartlett & Snow Co., C. O
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Wire & Cable (Electric)
*American Steel & Wire Co.

Wire Cloth
Buffalo Wire Works Co.
National Wire Cloth Co.
*Tyler Co., W. S.

Wire Rope
American Cable Co.
*American Steel & Wire Co.
Buffalo Wire Works Co.
Williamsport Wire Rope Co.

Wire-Rope Fittings
American Cable Co.
*American Steel & Wire Co.
Buffalo Wire Works Co.
Williamsport Wire Rope Co.

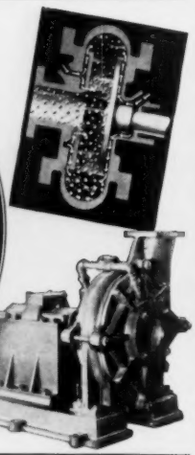
Wire Rope Slings
American Cable Co.
*American Steel & Wire Co.
Williamsport Wire Rope Co.

Wire (Welding)
*American Steel & Wire Co.

Worm Gears (See Gears and Pinions)

*** See also information in the 1934 Pit and Quarry HANDBOOK.**

HYDROSEAL DREDGE PUMP



Unique principle of hydrosealing both sides of the impeller against abrasive wear, cuts maintenance to a fraction and saves ⅓ in power costs in pumping sand, gravel, rock and other abrasive materials—Estimated economies guaranteed. Sizes 2" to 22", pulley or motor drive. Descriptive Catalog sent on request.

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PERFORATED METALS

are popular in the quarry fields. They wear well. Full range of sizes

Heat-Treated Double-Corrugated Plates

with square, round and "Sqround" perforations. Write for data, particularly on the new "Sqround" Mesh.

Investigate the Weston Testing Screen for making sizing tests.

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Detroit Hazleton New York Philadelphia Pittsburgh

New!

More Capacity!

Lower Costs!

Positive Uniformity!

Greater Efficiency!

The capacity of grinding mills is materially increased by this new Gayco Centrifugal Air Separator. Fines are removed as they are made.

It delivers an absolutely uniform product of any fineness desired from 60 to 400 mesh with greater capacity and lower power cost than is possible with any other type of air separator.

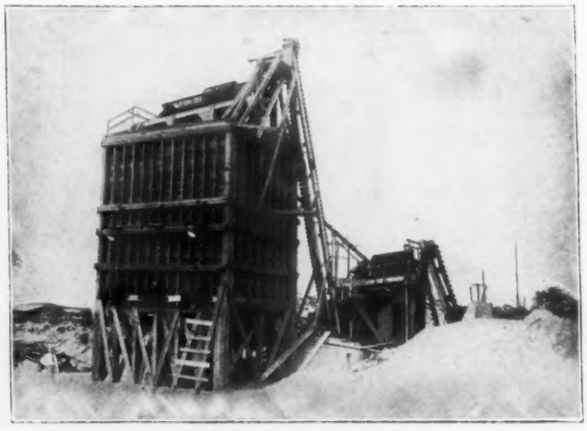
It is slow speed, requiring very little power. Repair costs are practically nothing—the only wearing parts are the steel cut gears and bearings enclosed in a dust proof casing.

Send for further details—

RUBERT M. GAY

Division, Universal Road Machinery Company

114 Liberty St. **New York, N. Y.**

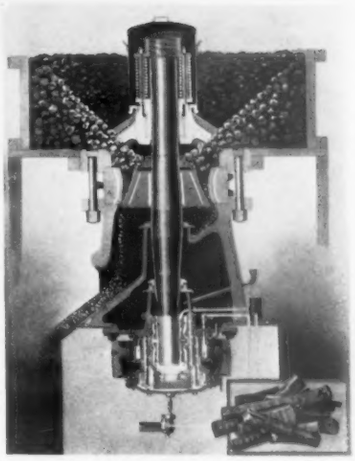


Crushing, Screening, Washing

equipment—Reliance—in capacities from 50 to 1500 tons per day. Built with simplicity of design for long hard service with low maintenance costs. Send for catalog and full information.

Universal Road Machinery Co.

Kingston, N. Y.



GREATER TONNAGE with HALF THE POWER COST *Guaranteed!*

The Kennedy Ball Bearing Gearless Gyratory Crusher is guaranteed to produce a greater tonnage than any other crusher of a given size, with half the power per ton of ore. This crusher can be equipped with a synchronous motor in its pulley, or driven by flat or V-belt from a standard motor.

The Savings Effected with this crusher are astounding:

In cost of Maintenance.....80%

In Power.....The entire cost of crusher and motor in pulley is amortized annually.

Sieving test on glacial gravel crushed at the rate of 18 tons per hour, with No. 19 crusher set to ⅛ in., and using less than 15 hp., follows:

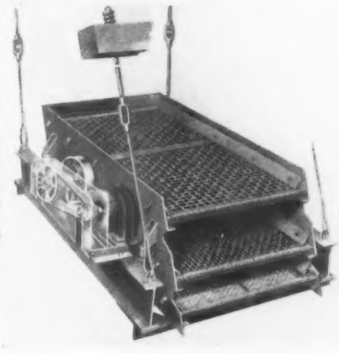
Minus ⅜ in.	100%
Plus 3 mesh	21½%
Minus 3—Plus 4	17%
Minus 4—Plus 14	36½%
Minus 14—Plus 48	15%
Minus 48—Plus 100	4%
Minus 100	5½%

KENNEDY VIBRATING SCREEN

Double Strength

High-Class Workmanship and Material

Greatest Capacity Guaranteed



No repair parts sold after 4 years in use except screen cloth

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Dust RESPIRATORS
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New in design . . . improved in principle, the "M" respirators give the highest all-around efficiency to protect your workers against severest dust conditions. Sturdily built, yet light in weight. No hindrance to workers. Test one on the job. Write for Bulletin No. 2, for full details.

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Perforated Metals — Screens of All Kinds — For Sand, Gravel, Stone, Etc.
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BUCKET ELEVATORS
REVOLVING SCREENS
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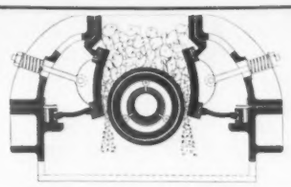
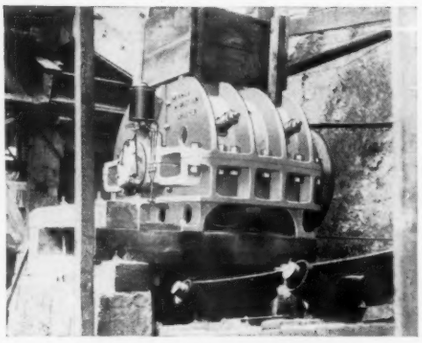


Higher output from continuous crushing action without idle or back strokes. Minimum oversize and small circulating load.

Lower costs due to rugged construction, fewer parts and even distribution of wear. Power savings, 50% or more as shown by field tests.

The Bonnot is not a roll crusher, and it has no troublesome gears, countershafts or eccentric sleeves. The **slow creep mantle** is a revolutionary advance in crusher design.



Manufactured under U. S. Patent No. 1,946,763

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BONNOT FEATURES

1. Utmost simplicity
2. Unusual ruggedness
3. Lowest headroom
4. Superior lubrication
5. Minimum choking
6. Extra long life
7. Lowest Upkeep costs
8. Safety plus
9. Big quality tonnage
10. Real power savings

CRUSHERS
HAMMER MILLS
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CANTON, OHIO

New York Office: 30 Church St., New York, N. Y.

BUILDERS OF REDUCTION MACHINERY SINCE 1891

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DREDGE PUMPS

Equipped with the

"WEAR RESISTER"

ARE CUTTING COSTS

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Don't Delay

INVESTIGATE

YOU TOO CAN SAVE

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SENSATIONAL pump performance is achieved by the new "Wear Resister"—a Pettibone Mulliken development that stops destructive abrasion by protecting pump shell, side plates and liners at vital points. It prolongs pump life, reduces repair costs, eliminates costly shutdowns and steps up production. It contributes to the high record of Diamond Dredge Pumps for *wearability* under severe conditions.

Write for Bulletin of the new "Wear Resister," and read how it may be adapted to your installation.

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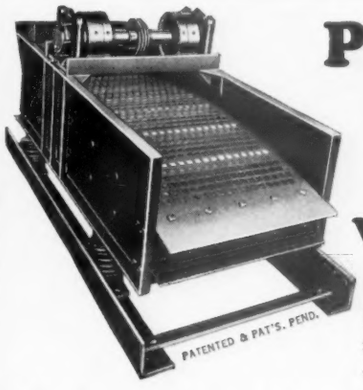

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Improved Heavy Duty

VIBRATING SCREEN

Built in all standard sizes and in from one to four decks.

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DEISTER COMPOUND FUNNEL CLASSIFIER

For hydraulic sizing of finer materials—5/16″ and down. Also for cleaning sand by elimination of silt, slime, vegetable matter and other light impurities.

Fully described in Bulletin No. 23

DEISTER MACHINE COMPANY

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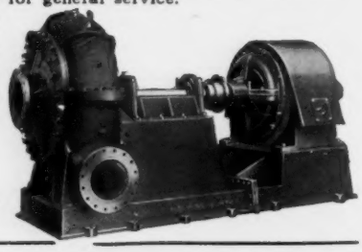
CENTRIFUGAL PUMPS

For hydraulic dredging, filling, sand and gravel production; hydraulic conveying of slurry and other liquids containing abrasive materials; clear water pumps for general service.

Also complete dredges with all accessory equipment. Dredging pump designs include heavy-duty types and special alloy parts for severe service. Types and sizes for the largest or smallest operations, and for belt, motor, steam, oil or gasoline-engine drive.



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GUARANTEED SCREENING SERVICE

LEAHY

THE DEISTER CONCENTRATOR CO.
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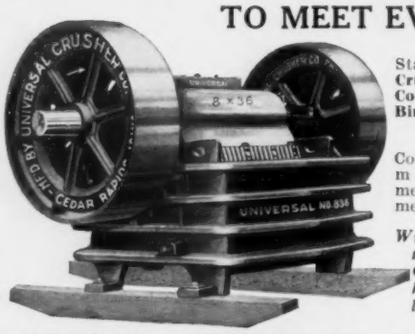
ROCK CRUSHERS
TO MEET EVERY NEED



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Crushers **Elevators**
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Bins **Pulverizers**
Crushing Rolls

Complete plants in many sizes built to meet individual requirements.

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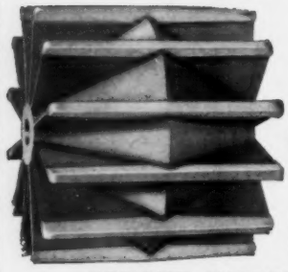
SAVE YOUR CONVEYOR
and
Elevator Belts *with* SPROUT-WALDRON Wing Pulleys



Interchangeable with standard pulleys. Nothing can lodge between belt and pulley.

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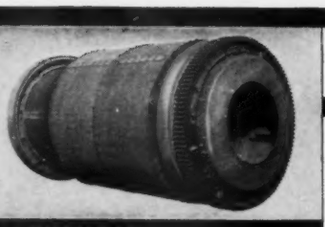
Elevating, Conveying and Transmission Equipment



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CRUSHERS
DRYERS
SKIP HOISTS
ELEVATORS
BELT CONVEYOR IDLERS
CONVEYORS

● Seven styles, for wet and dry screening, including hexagonal and round, jacketed and not jacketed, wire cloth and perforated plate designs are included in our complete line. Sizes to meet your requirements. Full details on request.

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has been hitting the "high water mark" for forty-five years. It is your assurance of economy in all of your pumping operations.

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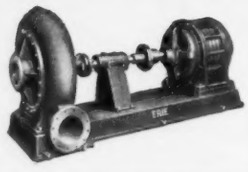

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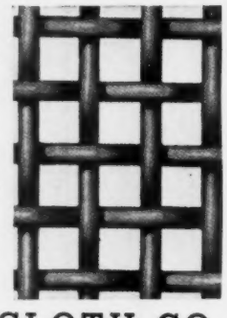
FIVE STAR FEATURES
of National Wire Cloth



- ★ Withstands vibration without crystallization
- ★ Super-tough to resist abrasion
- ★ Maintains accuracy throughout life of screen
- ★ Has outworn other special alloy cloths
- ★ Economical in price and serviceability

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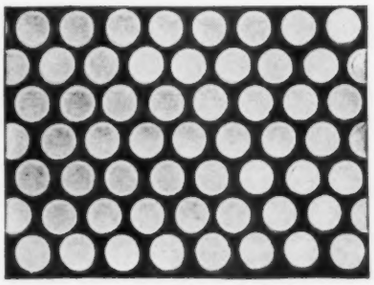
Advertise your wants and surplus equipment in

Pit and Quarry
with which is consolidated
CEMENT-MILL & QUARRY

MORROW SCREEN PLATES



MORROW PERFORATED METAL SCREEN PLATES for sizing and preparing coal, sand, gravel, stone and other bulk materials are made by a Company specializing in screening machinery.

A complete set of punches and dies covering a wide range of sizes, in round, square, oval and diagonal slots are ready for the press, insuring prompt delivery of orders.

The Morrow Manufacturing Co.
Wellston, Ohio

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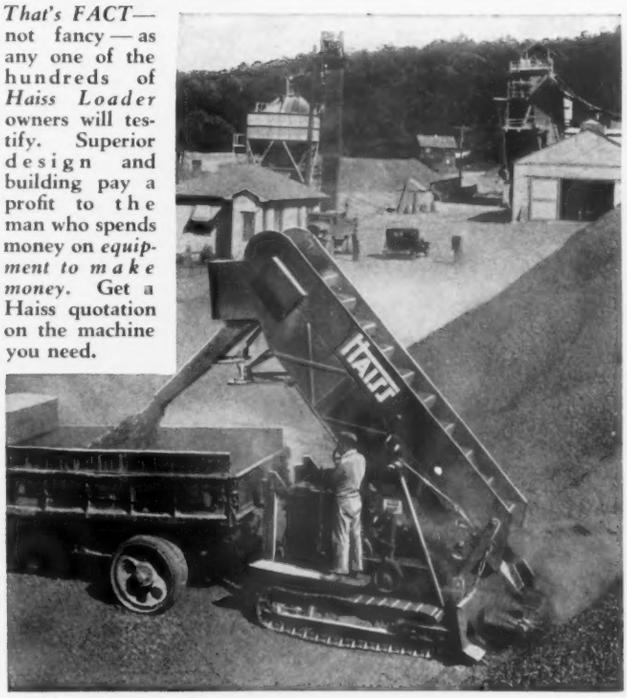
—for profit and satisfaction

That's FACT—not fancy—as any one of the hundreds of *Haiss Loader* owners will testify. Superior design and building pay a profit to the man who spends money on *equipment to make money*. Get a Haiss quotation on the machine you need.



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Builders also of HAISS ELEVATORS—SCREENS—CLAMSHELL BUCKETS

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Storage bins and skip hoist for sale

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It is suitable for handling sand, gravel, coke, coal or any other bulk materials.

The bins and hoist can be purchased either separately or as a unit.

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SUPER-WEAR WIRE CLOTH

Standard size meshes in stock.
Special weaves made to order.

Screening costs are due for a big slump. BUFF-ALOY gives a new lease of life to screen equipment and reduces replacement expense to a minimum. It is made from a special alloy wire developed by our engineers in our own laboratory—and tested in the toughest kind of screening service. It pays to specify BUFF-ALOY for all your screens—it is the modern abrasive resisting wire cloth.

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2—3 and 5-roll Raymond High Side Mills.
4—Ruggles-Coles Class A Rotary Dryers—4x20′, 5x26′, 5x39′, 8′ 8″x85′.
1—7′x20′ Silex Lined Tube Mill; Hardinge.
1—8′x22′ Kennedy Iron Lined Tube Mill.
4—6′x30′ Rotary Steam Tube Dryers, each 1300 sq. ft. heating surface.
1—36x36″, 4XC Gruendler Swing Hammer Mill
1—36x24″ Jeffrey Type D Hammer Mill
1—40x36″ Williams No. 6 Universal Hammer Mill.
12—Jaw Crushers—24x36, 36x30, 42x60 Farrel; 36x42, 42x48, 30x60 Traylor; 56x72 Buchanan; 42x40, 48x60 Allis Chalmers.
5—Symons Cone Crushers—2 ft.; 5½ ft.; 2—7 ft.
1—No. 50 Ingersoll Rand Drill Sharpener.
9—Crushing Rolls—8x5, 20x14, 36x16 Sturtevant; 30x10 Colorado Iron Works; 36x16, 42x16 Allis-Chalmers; 36x16, 42x16 Traylor.
5—Air Separators—30″, 10′, 12′, 14′.

Send for Bulletin No. 15 listing

All sizes and types Jaw, Gyratory and Roll Crushers, Swing Hammer Mills, Elevators, Belt Conveyors, Rotary and Vibrating Screens, Rotary Kilns and Dryers, Raymond and other fine Pulverizers, Air Separators, Hardinge Ball and Pebble Mills, silex and iron lined Tube Mills, Shovels and Cranes, etc.

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Shops and Yards at Newark, N. J., cover six acres
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GREGORY HI-GRADE-REBUILT

Electric Motor Driven Pumps, Air Compressors, Big Bargains. All Standard Makes Motors.

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Special **Extra**

5—21-ton 11x16″ Vulcan 36″ gauge 4-wheel saddle tank locomotives, Code boilers, built 1923.

2—21-ton 11x16″ Porter 36″ gauge 4-wheel saddle tank locomotives, Code boilers, built 1921.

1—21-ton 11x16″ American 36″ gauge 4-wheel saddle tank locomotive, Code boiler, built 1922.

75—4-yard WESTERN 36″ gauge steel underframe 2-way side dump cars, box-door type.

All purchased recent Court Sale at Edgefield, South Carolina. Immediate shipment. Thoroughly rebuilt since last used.

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JAW CRUSHERS—4″x8″-7″x11″-8″x14″-9″x15″-10″x16″-6″x20″ - 11″x22″ - 12″x24″ - 13″x30″ - 15″x30″ - 18″x30″-18″x36″ - 20″x50″ - 28″x36″ - 30″x30″ - 26″x42″ - 36″x48″-42″x60″-42″x48″.
Crushing Rolls—16″x10″ up to 54″x64″.
Gyratory Crushers—From No. 3 up to No. 12.
No. 0-No. 1 and No. 2 ring roll mill.
No. 0-No. 1—No. 1½ and No. 2 rotary fine crushers.
Swing hammer mills.
3′x25′-4′x30′-5′x50′-5½′x40′-6′x50′ direct heat rotary dryers.
4′x30′-4½′x26′-5′x30′ semi-indirect heat rotary dryers.
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Rotary cement kilns from 3′ to 8′ diameter.
Hardinge-Marcy and Fuller-Lehigh mills.
No. 0000-No. 000-No. 00-No. 0-No. 1—3 roll and 5 roll. Raymond mills.
One 6′x8′ Traylor ball mill.
5′x12′ and 4′x10′ rod mills.
Tube mills from 4′ to 7′ in diameter.
8′-10′ and 12′ air separators.
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Hoist—Air compressors—Pressure blowers.
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MOTORS—3 PH., 60 CY.

Hp.	Type	Speed
800	G. E. sl. rg.	720
600	G. E. syn.	860
2-600	G. E. sl. rg.	252
600	G. E. syn.	257
600	Al. Ch. syn.	240
3-675	Al. Ch. syn.	900
400	West. sl. rg.	514
400	Al. Ch. syn.	300
300	Al. Ch. sl. rg.	585
260	Al. Ch. syn.	720
250	West. sl. rg.	720
200	G. E. sl. rg.	1200
200	West. sl. rg.	500
200	F. M. sl. rg.	600
150	G. E. sl. rg.	1750
150	G. E. sq. c.	1750
100	Cr. Wh. syn.	225

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1-400 kva., Cr. Wh., 240 v., 3 ph., 60 cy., 120 r.p.m. to Hamilton Corliss Engine.

MOTOR GENER.
1-750 kw. G. E. MPC., 250 v., D.C. Gener. to 1100 hp. G. E., ATI, synch. motor, 2200-3-60-900 r.p.m.

CENTRIF. PUMPS
3-14,000 G.P.M., 150′ Head dir. conn., 675 hp. Al. Ch. 900 r.p.m. syn. motors.
1-14,000 G.P.M., 60′ Hd., dir. conn. 260 hp., Al. Ch. 720 r.p.m.

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SAND PUMPS

1-8″ Morris Heavy Duty Sand Pump driven by a 150 HP Slip Ring Motor. Price without motor $450.00 with motor $950.00 FOB cars Phila., Pa.

1-8″ Morris Standard Dredging Pump. Figure 18, direct connected to a Morris Vertical Engine, Factory Job. Price $375.00 FOB cars Phila., Pa.

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1—12′ Gayco Separator, model 21.
3—Hardinge Mills, 4½′x16″, 5′x22″, 8′x30″.
3—Jaw Crushers 10x7″, 24x12″, 30x60″.
2—Sturtevant No. 1, No. 1½ Rotary Fine Crushers.
1—Sturtevant No. 1 Ring Roll Mill.
4—Gates Gyratory Crushers No. 3D, No. 6D.
5—Traylor Crushing Rolls, 42x18″, 36x16″.
3—Raymond Mills, two roll, four roll, five roll.
6—No. 0000, No. 00, No. 1 Raymond Mills.
2—Rod Mills 5x10′, 4x10′.
2—12″ Traylor Bulldog Gyratory Crushers.
1—Symons 7′ Cone Crusher.
4—Tyler, Sturtevant Vibrating Screens, single and double units.
6—Hammer Mills, Jeffrey, Williams, Sturtevant.

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183 Varick St., New York City, N. Y.

1—25 ton Ohio Loco. Crane, 50′ boom. ASME boiler.
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1—Baldwin 75 ton 6 wheel Switcher (Oil Burner).
1—Marion 1 yd. Steam Crane, 40′ boom, on cats.
1—Marion 15 ton Gas Crane, 40′ boom, fairleads.
1—Link-Belt K-2 Crane, 40′ boom, 15 ton capacity.
1—Browning ⅝ yd. Shovel, 35′ crane boom.
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2—Universal 7½ ton Truck Cranes.
1—Lambert 3 drum Gas Hoist with Swinger.
1—60 HP Johnson locomotive type Boiler.
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1—Sullivan 310′ portable gas Compressor.
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1—1 yd. Page Dragline Bucket.
1—1 yd. Blaw-Knox Clamshell Bucket.
1—¾ yd. Browning Clamshell Bucket.
1—⅝ yd. Owen Digging Bucket.
1—⅝ yd. Kiesler Digging Bucket.
1—Morris 8″ Dredge Pump with 150 HP G.E. motor.
1—Morris 10″ Cent. Pump 2250 GPM@130′ head.
1—Goulds 12″ Cent. Pump with 50 HP G.E. motor.
1—Amer WellWks 6x8″ Cent. Pump 20HP West. motor
1—Thompson 6″ Self Priming Pump, Waukesha motor.
4—Humdinger Cent. Pumps, Gas Motors, Self Priming.
1—Labour 4″ Self Priming Pump.
2—Domestic 4″ Self Priming Pumps.
1—Domestic double diaphragm Pump with gas motor.
1—C. H. & E. Road Pump with Gas Motor.
1—G.E. motor, 150 HP slip ring.
2—No. 7 McKiernan-Terry Hammers.
1—No. 5 McKiernan-Terry Hammer.

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FOR SALE

Farrell 18x36 Jaw Crusher, type B
Reliance 8x14 Jaw Crusher
Sauerman 100′ Steel Mast & 1 yd. slackline bucket
Belt Conveyor 20″ wide, 100 to 200′ long
Conveyor Belt, 14″ to 36″
Belt Elevator with 30″ buckets, 80′ high
Jeffrey No. 3 Limepulver, Jaw Crusher & Pulverizer
Telsmith Revolving Screen, 40″x20′
Telsmith 2-deck Vibrating Screens, 3x6′ & 3x8′
4″ Centrifugal Pump with 4 cyl. gas. engine
Chainhoists, 1½ to 10 tons
3000′ 24″ gauge, 20 lb. track, switches and cars
Goulds 8x6″ Centrifugal Pump, 22 HP A.C. motor
New 75′ steel derrick boom in 3 sections

G. A. UNVERZAGT, 15 Park Row, New York City

DERRICK OUTFIT

1—15-ton Steel Stiff Leg Derrick, 80-ft. boom, 38-ft. mast—in A-1 condition.

LOCOMOTIVE CRANES

3—25-ton American 8-wheel cranes, 50-ft. boom; new in 1930.

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12-yd. Western Air, also Hand Dump Cars, Flats, Gondolas, Steel Hopper Cars, Box Cars.

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Erie ¾ Yd. Steam Shovel on Cats.
8 Ton Plymouth Std. Ga. Gas Locomotive.
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1 Std. Ga. Nordberg Track Shifter.
175 Bucyrus Shovel, 5 Yd. Dipper.
856′ Sullivan Ang. Cpd. Air Compressor with 152 Hp. 220 V. A.C. Motor Belted.
Derricks, Boilers, Engines, Locomotives, Gravel Plants, Road Rollers, Forms, Finishers, Oil Engines, Motors.

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The T. J. Lane Company
Springfield, Ohio

For Sale

1—No. 7½ McCully Crusher.
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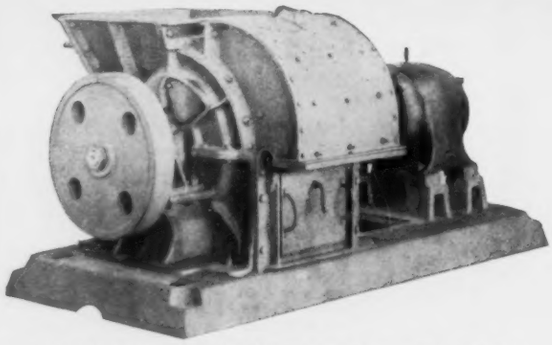

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Index to Advertisers

Allen-Sherman-Hoff Co. 54
*Allis-Chalmers Mfg. Co..... 8
American Cable Co..... 4
American Manganese Steel Co. 7
*American Pulverizer Co..... 64
*American Steel & Wire Co.. 11
Atlas Powder Co..... 16
*Austin-Western Road Machinery Co. 53

*Bartlett & Snow Co., C. O... 58
Binks Mfg. Co..... 56
Birmingham Rail & Locomotive Co. 60
Bonnot Co. 57
Broadcast Section 60-62
Buffalo Wire Works Co..... 59
Burnham, Royal E..... 62

Chicago Perforating Co..... 56
Consolidated Products Co... 60

*Deister Concentrator Co..... 58
Deister Machine Co..... 57
*Dixie Mchy. Mfg. Co..... 51

*Eagle Iron Works..... 56
*Ensign-Bickford Co. 51

Equipment Corporation of America 61
Erie Pump & Engine Works. 58

General Motors Truck Co... 1
Goodyear Tire & Rubber Co. 3

Haiss Mfg. Co., Geo..... 59
Heineken, W. P. 60
*Hendrick Mfg. Co..... 54
Hetherington & Berner, Inc. 64

Iowa Mfg. Co..... 15

*Jeffrey Mfg. Co..... 56

*Kennedy-Van Saun Mfg. & Engr. Corp. 55
Krupp Grusonwerk 53

Lewis, Harry, Co..... 60
Lewistown Foundry and Machine Co. 56
*Link-Belt Co. 5

McLanahan and Stone Corp. .....Back Cover
*Morris Machine Works..... 58
Morrow Mfg. Co..... 59

Mott Core Drilling Co..... 62

National Wire Cloth Co..... 58

Ohio Power Shovel Co..... 9

Pennsylvania Drilling Co.... 62
Pettibone Mulliken Co..... 57
Pioneer Gravel Equipment Mfg. Co....Inside Front Cover
Productive Equipment Corp. .....Inside Back Cover
Pulmosan Safety Equipment Corp. 56

Raymond Bros. Impact Pulv. Co. 13

Smith Engr. Works..... 6
Sprout, Waldron & Co..... 58
State Line Machy. Co..... 61
Stein-Brill Corp. 60
Stephens-Adamson Mfg. Co. 12

*Tyler Co., W. S.....Front Cover

*Universal Crusher Co..... 58
Universal Road Machy. Co.. 55

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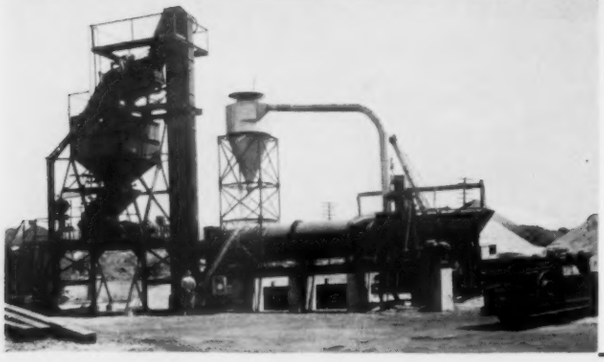
***See also information in the 1934 Pit and Quarry HANDBOOK**

H&B BITUMINOUS PAVING MACHINERY



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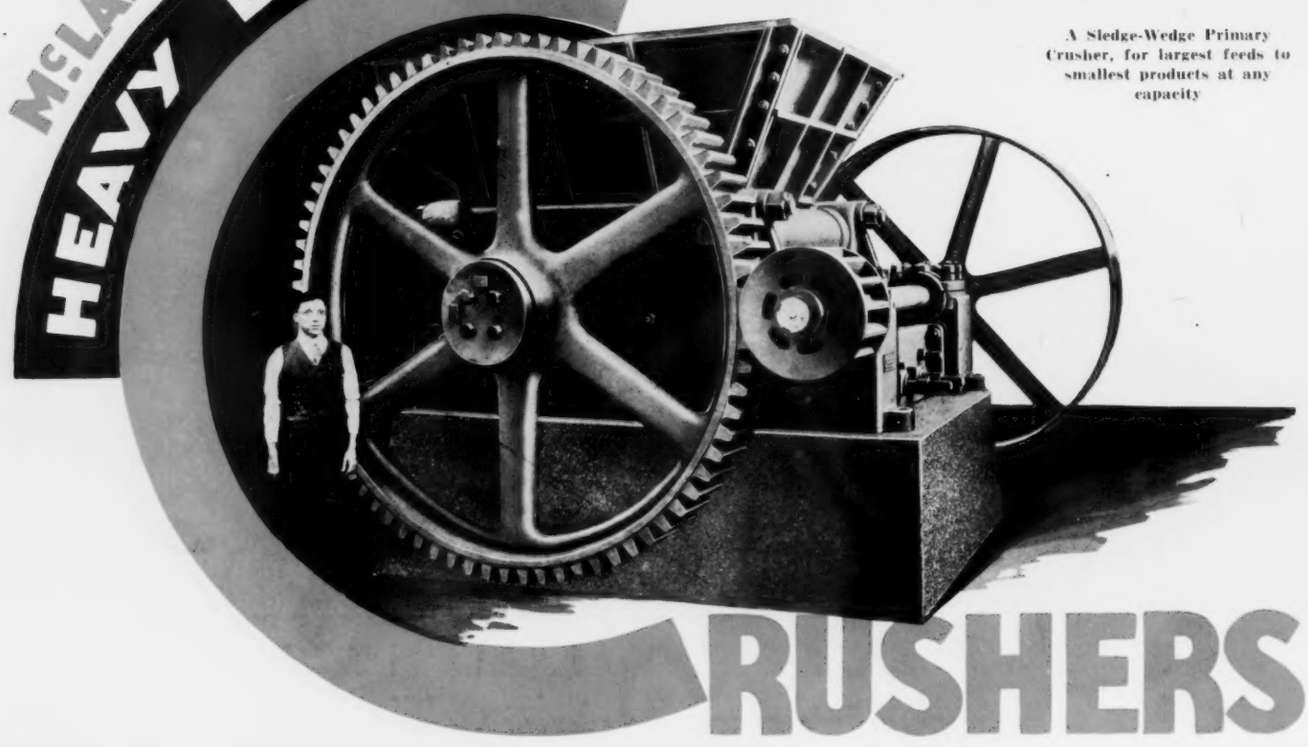
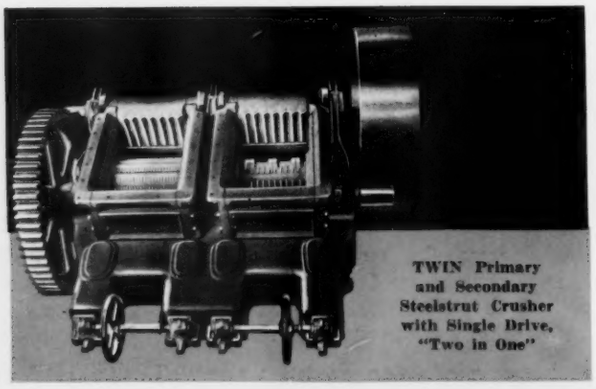


A Sledge-Wedge Primary Crusher, for largest feeds to smallest products at any capacity

CRUSHERS



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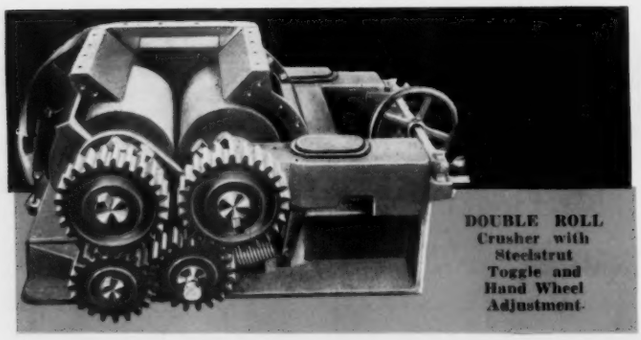
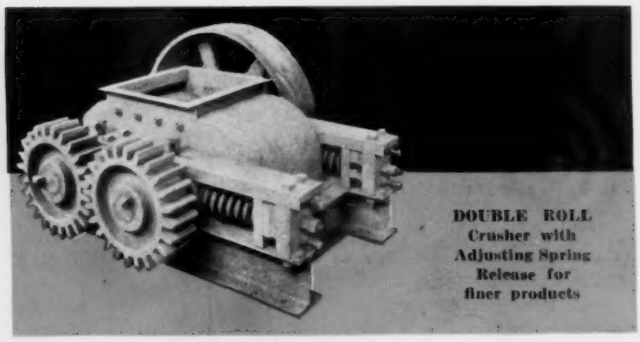


DOUBLE ROLL Crusher with Steelstrut Toggle and Hand Wheel Adjustment



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